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PROFESSOR CHARLES CAMERON

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BRITISH JOURNAL OF
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AND DISEASES OF THE CHEST

Vol. XLVI. April, 1952 No. 2.

PROFESSOR CHARLES CAMERON, C.B.E., M.D., F.R.C.P.E. —AN APPRECIATION

By Professor D. M. Dunlop
From the Royal Infirmary, Edinburgh

Professor Charles Cameron retired from the Chair of Tuberculosis in the University of Edinburgh at the beginning of the year.*

After taking an M.A. degree Cameron graduated M.B., Ch.B., with honours, at Glasgow University in 1911, took his D.P.H. in 1913 and his M.D. with commendation for his thesis in 1921. He is a Fellow of the Glasgow Faculty of Physicians and Surgeons and of the Edinburgh College of Physicians.

Apart from a period of service as a Captain in the R.A.M.C. in the first World War, all his working life was spent in Scotland, first as assistant Medical Officer of Health in Glasgow and then as medical superintendent of Ochil Hills and of East Fortune Sanatoriums respectively. At East Fortune he established his reputation as the foremost tuberculosis physician in Scotland, and it was no surprise to his numerous admirers when he was appointed to the Chair of Tuberculosis in the University of Edinburgh in 1945 with large clinical responsibilities in the South-east of Scotland. Here he nobly maintained the high traditions of teaching established by his predecessor—that great man Sir Robert Philip—for whose views on tuberculosis Cameron always expressed the profoundest admiration.

Advance in medical science generally is being achieved by increasing specialisation. Internal medicine, for example, is rapidly being fragmented into neurology, cardiology, gastro-enterology, hæmatology, endocrinology, etc. The same fragmentation has occurred in tuberculosis. The numerous advantages attending this specialisation are associated with certain grave disadvantages. The chest physician, viewing his patient as through the glass darkly of his pneumothorax bottle, often fails to see the man face to face; the orthopædic specialist, obsessed with the immobilisation of a tuberculous joint, misses the pus cells and tubercle bacilli in his patient's urine; and the urologist is apt to forget that the removal of a tuberculous kidney is only an incident in his patient's cure and does not liquidate the wider responsibilities of after-care, Sir Robert Philip always deplored the tendency—at one time very rigid—to subdivide tuberculosis into surgical and medical types, or to think of it purely in terms of the pulmonary variety of the disease. Cameron followed Sir Robert in this respect. He was deeply interested in the natural history of the disorder,

* See page 127.

which he surveyed in all its aspects, finding in it a completely satisfying and absorbing discipline—epidemiological, bacteriological, social and clinical. His vast clinical knowledge embraced all forms of tuberculosis. He was not only a superb chest physician, but he was interested and proficient in the diagnosis and management of the glandular, bone and joint, meningeal, genito-urinary, ophthalmological and dermatological manifestations of the disease. The writer of this article, who has some interest in endocrinology, has frequently been astonished at Cameron's mastery of such subjects as Addison's disease, and the management of diabetes in the tuberculous patient. There have never been many tuberculosis specialists of this type, and now that Cameron has retired there can be very few left who can profess tuberculosis as a whole and not just a facet of the subject.

Cameron culled the literature on tuberculosis omnivorously from all the journals of the world. His memory of it is prodigious, and his criticism of it penetrating and at times devastating. His papers to learned societies and his published work bear the hall-mark of his wide erudition. His shrewd, cultured conversation is a delight and an inspiration, for all the learning and discipline of academic, clinical and laboratory experience are in it. He has constantly adapted his views to what is best in modern thought, though sternly rejecting what is meretricious and ephemeral.

Cameron is typical of a certain type of Scotsman. His appearance is tall, lantern-jawed and grey, lit with an occasional attractive but rather sad smile. His passion for work has left him little time for hobbies or hedonistic pursuits. His standards of perfection have made it difficult for him to delegate; everything has to be done with meticulous accuracy and care, and therefore mostly by himself; in consequence he has been perhaps less successful in the training of assistants than in the teaching of undergraduate and post-graduate students. His social modesty and diffidence make it surprising and alarming when one comes up against his passionate and unshakeable principles and strong prejudices.

Cameron retires from Edinburgh to settle in the peace of the Scottish countryside. Retirement for such a man will not be easy, but he is happy in his family life and his family may now be able to see something of him. In Edinburgh we will miss that repository of wisdom and knowledge on which we have drawn so freely. He leaves us surrounded by the esteem and affection of his colleagues and patients, and with their best wishes for a long, happy and active retirement.

GENERAL ARTICLES

THE DIFFERENTIAL DIAGNOSES IN CHILDREN OF THE PULMONARY MANIFESTATIONS OF PRIMARY TUBERCULOSIS AND ITS IMMEDIATE SEQUELÆ*

By L. G. Blair

From the Radiological Department, Brompton Hospital, and Diagnostic X-Ray Department, the Hospital for Sick Children, Great Ormond Street, London.

The radiological appearance of the primary lesion in the lungs may vary considerably according to the stage of development. If seen early enough, the lung lesion itself, if not hidden behind the heart shadow or diaphragm, is usually recognisable, and is practically always of the rounded focus type. This rounded focus may be very small or, as in the case illustrated, quite large, and it is associated with glandular enlargement, involving one or more groups of the mediastinal glands (Fig. 1). Such glandular enlargement is, as a rule, visible on the X-ray film.

Because the primary focus itself is often situated close to a pleural surface, there is frequently an accompanying pleural effusion, though possibly minimal in amount and merely shown by stripping of the pleura. Also, the gland, owing to ulceration into or compression of a bronchus, may cause a segmental atelectasis, the segment involved not necessarily being the one in which the primary focus lies. If it is the one in which the primary focus lies, the rounded opacity is then lost in the triangular shadow of the segmental lesion (Fig. 2). As healing occurs and the segment becomes aerated, the original focus again becomes visible, frequently much smaller and, very frequently indeed, showing calcification. At the same time, calcium appears in the glands which were involved in the process. If the collapse persists for any length of time, and particularly if infection supervenes, then bronchiectasis will develop, and bronchiectasis is in my experience a very common sequela of the primary tuberculous infection. It will be recognised by the presence of fairly parallel linear shadows radiating out into the segment which was involved (Fig. 3).

At the stage of the round focus, if an enlarged gland is recognised, then the diagnosis is straightforward. Tomograms at root level are very useful in establishing the presence of such an enlarged root gland. If there is no recognisable glandular enlargement the diagnosis is more difficult, but the other causes of rounded shadows in the lungs of children are nevertheless comparatively rare. They are primary neoplasm, either benign or malignant, solitary secondary deposits, hydatid cysts and the extremely rare congenital fluid-containing cysts. To reach a diagnosis it will be necessary to watch the subsequent behaviour of the lesion, as none of these alternatives will behave in a way typical of tuberculosis.

If the primary focus itself is not visible, the enlarged mediastinal glands will

* Based upon a post-graduate lecture given at the Brompton Hospital, London.

be noted, and the other causes of glandular enlargement will have to be considered in the differential diagnosis. If all the mediastinal glands are involved, and the involvement is at all marked, a lobulated shadow will be seen extending to both sides of the mid-line, and situated in the anterior half of the chest. It is rare, however, in this country, to get such gross enlargement of the mediastinal glands in primary tuberculosis, and the other causes, such as Hodgkin's disease, lymphosarcoma, leukæmia and Boeck's sarcoidosis, though this latter is also not common in children, should be considered first. In leukæmia the blood count should solve the problem, but in Hodgkin's disease and lymphosarcoma, if there are no external nodes present from which a biopsy can be obtained, it may be necessary to give diagnostic doses of deep X-rays. Unfortunately, in children it is not uncommon to get either Hodgkin's disease, lymphosarcoma or leukæmia, giving rise to enlargement of a localised group of glands, and then, if the primary focus is not visible, unless the Mantoux is negative, the diagnosis may be extremely difficult. Again, it may be necessary to have recourse to deep therapy. It must be remembered that there may also be lung involvement in the three conditions mentioned, but it is rarely of the localised and fairly typical type seen in primary tuberculosis, although collapse of a lobe may occur, but as a rule only when the glandular enlargement is very marked.

At the stage of the segmental lesion and in the absence of recognisable glandular enlargement the problem is much more difficult, as these segmental lesions are extremely common in children. The collapse may not be complete and the segment involved may still be partially aerated. The collapse factor will be recognised by the crowding of the vascular markings in the particular segment involved. The commonest cause, undoubtedly, of such lesions is an ordinary infective process, which we will call, for the sake of a better term, " a pneumonitis," very frequently associated with an upper respiratory tract infection. In this case, in contradistinction to a primary lesion, rapid and complete resolution should occur and the residual damage of a tuberculous infection will not be present. Segmental lesions, again of a temporary nature, are also quite common in asthma and undoubtedly due to blocking of the bronchus by secretion. Inhaled foreign body must always be considered, and there is little doubt that when a segment of lung remains completely airless for more than a few days broncoscopy is indicated. Atelectasis, as has already been mentioned, may occur secondarily to the other causes of mediastinal glandular enlargement, but as a rule the glandular enlargement is so massive that one considers these alternative causes before primary tuberculosis.

The segmental lesion may appear in another guise in the radiograph. We have already considered the homogeneous opacity of a completely airless segment and the crowding of the vascular markings in a partially aerated one. In some cases a ball-valve obstruction may be created, giving rise to an overdistended lung, lobe or segment. The commonest cause of such ball-valve obstructions are undoubtedly the primary tuberculous infection and foreign body, and the diagnosis may well be missed in the ordinary standard film taken in inspiration (Fig. 4), but will be readily recognisable in an expiratory film or on screening, the affected portion then remaining relatively more translucent (Fig. 5). Thus, if either of these conditions is suspected on clinical grounds,

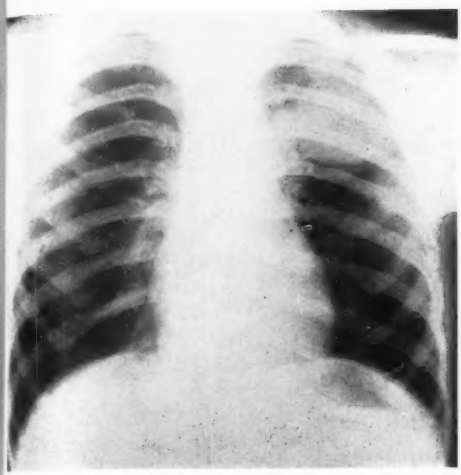

FIG. 1.—Rounded primary lesion in left upper zone, with an enlarged gland at the root.

FIG. 2—The same case. The rounded shadow is now lost in the triangular opacity of the segmental lesion.

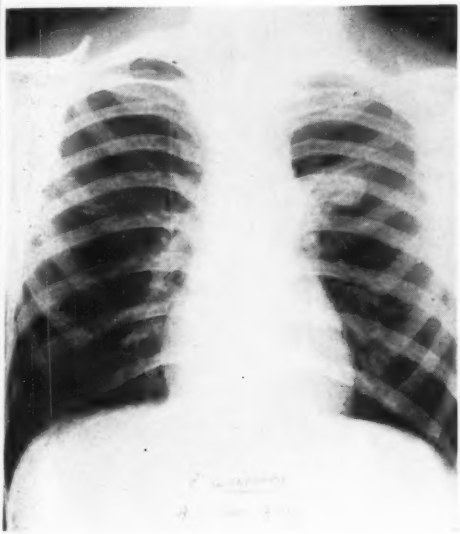

FIG. 3—The rounded shadow is now visible and contains calcium. There are linear shadows present indicating bronchiectasis.

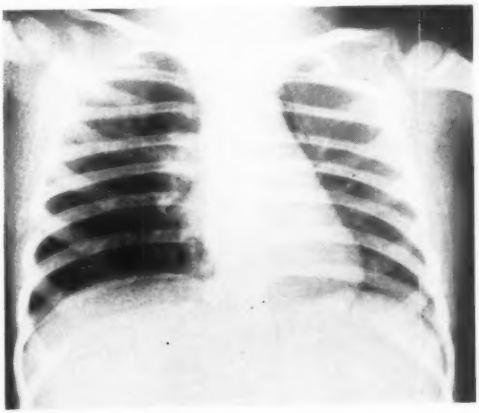

FIG. 4.—Obstructive emphysema of the right lung, due to a gland at the root ulcerating through into the bronchus. Film taken in inspiration.

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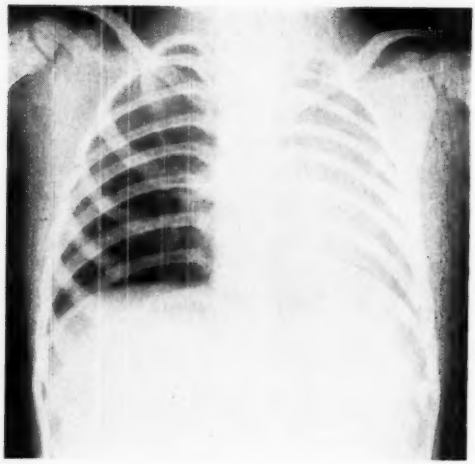

FIG. 5.—Same case as FIG. 4, the film being taken in expiration and showing that owing to the ball-valve obstruction the air cannot escape from the right lung. The child therefore over-breathes with the left side.

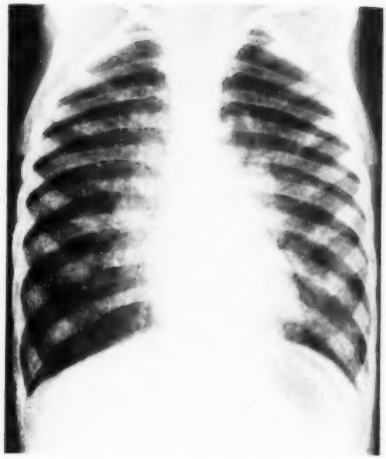

FIG. 6.—Pulmonary appearances associated with fibrocystic disease of the pancreas.

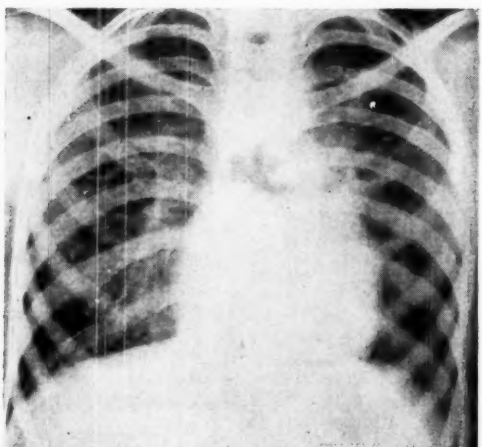

FIG. 7.—Disseminate lesion in the lung in a case of Xanthomatosis.

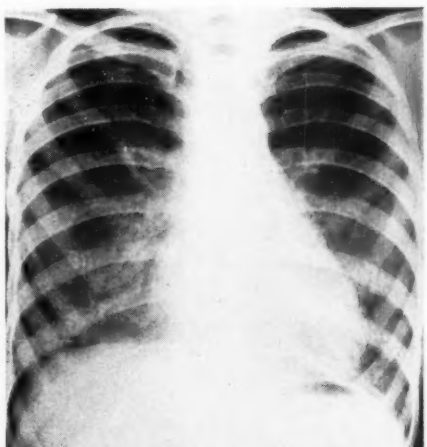

FIG. 8.—Pulmonary appearances in "essential haemosiderosis."

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both inspiratory and expiratory films should be taken or the child should be screened. The presence of a segmental lesion of any of the three types described, associated with an enlarged root gland, is always strong presumptive evidence of a primary tuberculous infection.

Cavitation may occur in primary tuberculosis, though not commonly, and this must be differentiated from acute lung abscess and a further type of cavity, not at all uncommon in children, to be described. In acute lung abscess the sputum, unlike that in tuberculosis, is frequently fœtid. In tuberculosis also, if there is cavitation it should be possible to find the acid-fast bacillus either in the sputum or, in the absence of sputum, in the gastric washings. In the other type of cavitation occurring in children softening starts in the centre of an opacity, and there is often a fluid level. The surrounding consolidation then disappears, and the final appearances are those of a thin-walled cyst. This eventual thin wall should help to distinguish it from a primary tuberculous cavity.

Either because the child's resistance is poor or the primary infection has been particularly massive, there may be an early and rapid dissemination by various channels throughout the lungs. Thus, there is often a disseminate lesion involving all zones. The shadows then may be pin-head in size, as in the true acute miliary tuberculosis, or coarser in the the so-called chronic miliary tuberculosis. It is possible that this latter may not be blood-borne, but due to spread by lymphatics. The opacities may be coarser still, as in a tuberculous broncho-pneumonia. In all types the distribution is the same. The apices are involved, and one gets the impression that the nearer to the bases the clearer the lung fields. Again, as these conditions follow as a rule closely on the primary infection, there is often evidence of moderate glandular involvement. A disseminate lesion throughout both lungs and moderate glandular involvement suggests tuberculosis as the most likely cause, unless the glandular involvement is very massive, when the other causes of enlarged mediastinal glands, such as Hodgkin's disease, must be considered. If the term "acute miliary tuberculosis" is retained, as I think it should be, for the opacities of pin-head size, there is in children practically nothing except tuberculosis which will give rise to this appearance. If the opacities are larger and coarser the various other forms of broncho-pneumonia must be considered. In these conditions there is much more tendency to coalescence of the shadows, a happening which is uncommon in tuberculosis, and of course the climical condition should help to differentiate between the two. In the ordinary broncho-pneumonias the child is as a rule much more ill, and either dies quickly or recovers quickly, whereas in tuberculosis, at least before the days of streptomycin, the condition was almost invariably, except possibly in the chronic miliary form, progressive. Multiple secondary deposits must also be considered, but in children these are much more commonly of the larger rounded type. Broadly speaking, the distribution of secondary deposits is the opposite of that seen in tuberculosis, the bases being more heavily involved and the apices clear.

There is a further quite common condition in children and particularly in infants which may give rise to a disseminate lesion associated with generalised emphysema. This is fibrocystic disease of the pancreas. Owing almost certainly to the general increase in viscosity of the body secretions, there is

partial obstruction of the bronchial tree, which leads to emphysema and, very frequently, subsegmental areas of atelectasis (Fig. 6). If such appearances are present and persist, particularly in an infant, this diagnosis must be considered. If the infant survives to later life, bronchiectasis may develop, often as the scattered peripheral type, and not, as a rule, completely segmental in distribution, as occurs so frequently after a primary tuberculous infection.

The reticuloses, such as xanthomatosis, on occasion give rise to disseminate lesions in the lungs (Fig. 7). The general condition of the patient, the comparatively slow rate of radiographic change, and associated symptoms such as diabetes insipidus, should suggest the possibility of such a diagnosis. X-ray examination of the skeleton will often reveal the typical areas of bone replacement found in these conditions. There is another and rare condition which may give rise to small rounded shadows scattered throughout the lungs, and which should be mentioned for the sake of completeness. This is essential hæmosiderosis in which there are deposits of hæmosiderin in the lungs (Fig. 8). In these cases the mottling often tends to be more central with clearing towards the periphery, and often has not the distribution of tuberculosis. Again, the clinical picture, the frequency of hæmoptysis, and the extremely slow rate of change in the radiographic lesion, should enable a correct diagnosis to be reached. Finally, Boeck's sarcoidosis can occur in children, but it is not common. It should be suspected if there is generalised lung involvement and a negative Mantoux. It may then be possible to demonstrate the typical changes in the phalanges or careful examination may reveal enlarged peripheral lymph nodes, the biopsy of which will give the diagnosis.

THE DIAGNOSIS AND TREATMENT OF BRONCHIAL CARCINOMA IN THE PRESENCE OF ACTIVE PULMONARY TUBERCULOSIS

A REPORT OF FOURTEEN CASES

By W. H. Helm and A. J. Moon
From the London Chest Hospital

Introduction

Carcinoma of the bronchus and pulmonary tuberculosis do occasionally coexist and there seems little ground for the belief, once widely held, that these conditions are antagonistic. In fact, some evidence has been advanced that pulmonary tuberculosis may predispose to bronchial carcinoma (Simons, 1937; Fried, 1948). This combination may now occur more frequently owing to the increase in carcinoma of the bronchus together with the increase of pulmonary tuberculosis in the carcinoma age group. Drymalski and Sweany (1948) report the presence of bronchial carcinoma in 0·75 per cent. of 2,000 autopsies in cases of pulmonary tuberculosis, and Gerstl *et al.* (1946) in 1,600 autopsies for tuberculosis found bronchial carcinoma in 0·44 per cent. Farber *et al.* (1949) in a series of 266 autopsied cases of bronchial carcinoma found evidence of active pulmonary tuberculosis in 3·8 per cent. Bryson and Spencer (1951) in a similar series of 866 autopsied cases of bronchial carcinoma found active pulmonary tuberculosis present in 1·8 per cent.

Maxwell (1948) states that tubercle bacilli are found in the sputum of about 10 per cent. of cases of malignant growth. It is difficult to make any definite estimate of the frequency of this at the London Chest Hospital, but it would appear to be about 1 per cent.

The recent encouraging results of resection for carcinoma of the bronchus (Ochsner *et al.*, 1948; Taylor and Waterhouse, 1950) indicate that it is more than ever important to recognise this condition as early as possible. The presence of tubercle bacilli in the sputum (T.B. positive) or of clinically active pulmonary tuberculosis has often been the cause of delay or mis-diagnosis.

Each disease may so closely resemble the other that in the presence of a T.B. positive sputum it may be possible to make a definite diagnosis of bronchial carcinoma only at thoracotomy or on histological examination.

The present series of cases is presented in an attempt to indicate certain points which may help to establish a positive diagnosis in some instances, and in others to arouse doubt sufficient to justify exploratory thoracotomy.

Case Reports

Case 1

A man aged 61 who had had a cough for twenty years said that following pneumonia six months before admission the cough had increased and was

accompanied by persistent muco-purulent blood-stained sputum. His fingers were clubbed. X-ray of his chest showed cavitated fibroid pulmonary tuberculosis of the right upper lobe and a large round, solid opacity in the left upper lobe; this latter increased considerably in size in six weeks. His sputum was consistently T.B. positive and contained a few neoplastic cells. Pleural biopsy confirmed that the left upper lobe mass was a carcinoma. (Fig. 1.)

CASE 2

A man aged 58 who had had a left-sided pneumonia three years previously complained of a sharp pain in the left side of his chest with cough, blood-stained sputum and dyspnœa for one week. On examination there was no clubbing, his voice was hoarse and there were rhonchi over the left upper zone. Chest X-ray showed chronic tuberculosis at the right apex and a small left hilar opacity. The sputum was repeatedly T.B. positive and also contained squamous carcinoma cells. Bronchoscopy showed a squamous-celled carcinoma of the left main bronchus. The growth was considered inoperable because of a left laryngeal palsy, and the patient died ten months after he was first seen.

CASE 3

A man aged 27 complained of three months' dyspnœa and lassitude accompanied by loss of weight of 1 stone. In the last month he had also developed pain in the left upper chest and a dry cough. Chest X-ray showed a dense opacity with some surrounding soft infiltration at the left apex. His sputum was then T.B. positive and bronchoscopy was normal. Serial films showed the opacity to be increasing in size, until after nine months it occupied the whole of the left upper lobe; during this time his sputum was T.B. negative on ten consecutive occasions, and, although treated as a case of pulmonary tuberculosis by bed-rest, left phrenic crush and pneumoperitoneum, his general condition slowly deteriorated and he died twenty months after he was first seen. Post-mortem examination showed an undifferentiated bronchial carcinoma invading the whole of the left upper lobe.

CASE 4

A woman aged 37, who had developed pulmonary tuberculosis in the left lung with a T.B.-positive sputum and was treated by sanatorium régime and a left artificial pneumothorax, remained well for five years, after which routine X-ray showed a shadow at the right hilum. Four months later she began to cough and wheeze and to lose weight. This was followed by pain in the right side of her chest, increasing dyspnœa and further loss of weight. X-ray showed a right hilar opacity and a collapsed right lower lobe; a left A.P. was also present. Bronchoscopy showed the right lower lobe bronchial lumen to be blocked by an undifferentiated carcinoma. She died nine months after the hilar shadow was first noted. (Fig. 2.)

CASE 5

A man aged 56 who had had bronchitis for years complained of loss of weight of 1 stone in six months. On examination clubbing of the fingers was present and there was bronchial breathing at the left apex. X-rays showed a dense opacity in the left upper lobe with partial collapse and some surrounding soft infiltration. His sputum was T.B. positive and, after several examinations, squamous carcinoma cells were found. Bronchoscopy was negative. He was treated by bed-rest, para-aminosalicylic acid (P.A.S.) and streptomycin with

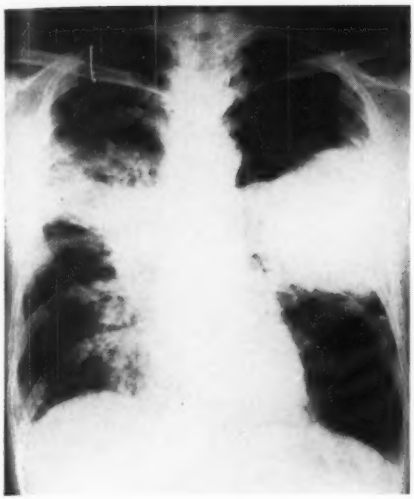

FIG. 1.—CASE 1.

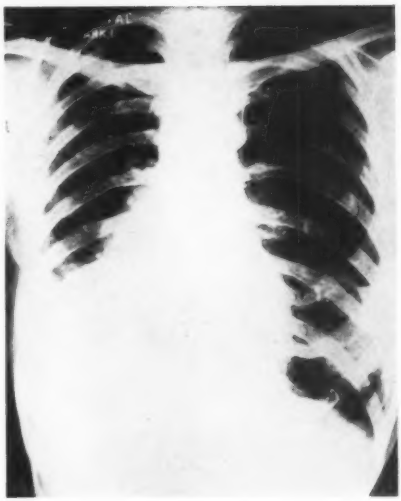

FIG. 2.—CASE 4.

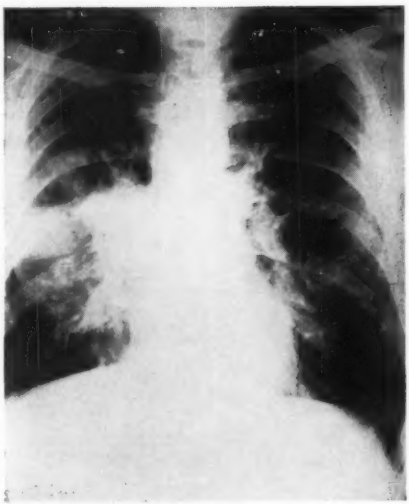

FIG. 3*a*.—CASE 6.

FIG. 3*b*.—CASE 6

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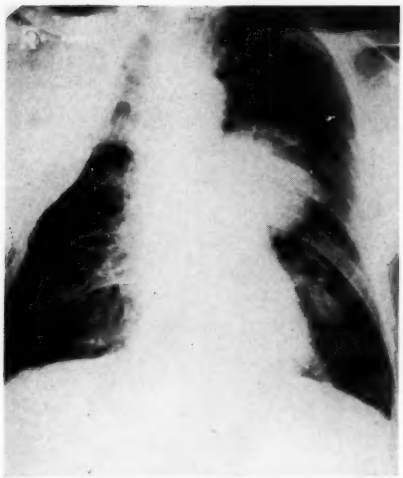

FIG. 4.—CASE 7.

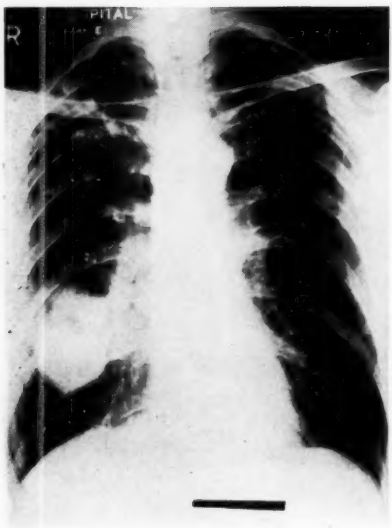

FIG. 5*a*.—CASE 11.

FIG. 5*b*.—CASE 11.

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a view to rendering him fit for thoracotomy for the suspected carcinoma. His sputum became T.B. negative, but clinically and radiologically he continued to deteriorate, making operation impossible. He died ten months after he was first seen.

CASE 6

A man aged 50 complained of loss of 2 stone in weight in six months accompanied by increasing lassitude, and followed two months later by the onset of cough with sputum, dyspnœa and substernal pain. X-ray showed a small right hilar opacity and a peripheral shadow suggestive of consolidation in the middle lobe. There was also some surrounding soft infiltration. His sputum was T.B. positive but had become, and remained, negative three months later on admission to a sanatorium. At this time the hilar opacity had enlarged and on examination there was moderate clubbing of the fingers. Bronchoscopy showed a squamous-celled carcinoma of the right lower lobe bronchus. A right pneumonectomy was carried out and the patient remains well seven months later. (Fig. 3*a* and *b*.)

CASE 7

A man of 44 who developed right apical cavitated pulmonary tuberculosis with a T.B. positive sputum was successfully treated by a right thoracoplasty followed by sputum conversion. One month after operation a small shadow in the apex of the left lower lobe was noted on X-ray. Bronchoscopy was normal and his sputum was again T.B. positive on two occasions and showed a few neoplastic cells. The shadow increased rapidly in size and a segmental resection of the apex of the left lower lobe was therefore carried out. An undifferentiated carcinoma was present. He is still alive five months after operation. (Fig. 4.)

CASE 8

A man aged 64 gave a three months' history of increasing weakness, cough, pain and dyspnœa. Chest X-ray showed dense bilateral apical infiltration with probable cavitation, and in the anterior segment and lingula of the left upper lobe there was a dense round opacity 3 inches in diameter. There was also a right hilar shadow suggestive of glandular enlargement. The sputum was T.B. positive. He died three weeks after he was first seen and post-mortem examination showed a breaking-down squamous-celled carcinoma in the left upper lobe with fibro-caseous tuberculosis in both upper lobes.

CASE 9

A man aged 59 complained of pain in the chest for five weeks with cough, blood-stained sputum, dyspnœa and loss of weight. X-rays showed a dense opacity in the right lower zone with some collapse of the right lower lobe. His sputum was positive for tubercle bacilli. He died three weeks later and post-mortem examination revealed a tuberculous cavity at the right apex and an oat-celled carcinoma of the right lower lobe bronchus.

CASE 10

A man aged 62 complained of pain in the chest, cough, sputum and some loss of weight for three months. X-ray showed partial collapse of the left upper lobe and his sputum was T.B. positive. He refused admission until four months later, when his general condition had deteriorated with further loss of weight.

His sputum was persistently T.B. negative. He died seven months later. Post-mortem examination showed an adeno-carcinoma of the left main bronchus with widespread secondary deposits.

CASE 11

A man aged 51 complained of a cough with sputum and pain in the right side of the chest. X-ray of his chest at this time showed a rounded opacity in the right lower zone containing a fluid level with one small round discrete shadow below it, and also some scattered round shadows, partially calcified, in the right upper zone. His sputum was T.B. positive. He was sent to rest in bed for three months and given P.A.S., but his previous symptoms continued and he also became dyspnœic. On admission to hospital four months later clubbing was present. X-ray then showed increase in size of the main opacity, but the cavitation was no longer seen and a second discrete rounded opacity had appeared below it; the upper zone shadows remained unchanged. The sputum was at this time T.B. negative, but several specimens contained neoplastic cells. Bronchoscopy was negative. Right pneumonectomy was successfully carried out six months after he was first seen in a chest clinic. The lung contained a massive squamous-celled carcinoma of the right lower lobe with two daughter growths nearby: the upper lobe contained caseous and calcified tuberculous foci. (Fig. 5*a* and *b*.)

CASE 12

A man aged 39 complained of loss of 2 stone in weight: he had recently developed pain in the right side of his chest which was worse on breathing. Chest X-rays showed collapse of the anterior segment of the right upper lobe and a small right hilar opacity. On the left there were some apical shadows suggestive of pulmonary tuberculosis. His sputum was T.B. positive on two occasions, but subsequently it was consistently negative. Serial X-rays showed rapid enlargement of the right hilar opacity, and his sputum became persistently blood-stained. Bronchoscopy showed a neoplasm at the level of the right upper lobe bronchus. He developed a superior vena caval obstruction and was therefore considered inoperable and radiotherapy was recommended.

CASE 13

A man aged 53 complained that five months previously he had developed a cough with occasional blood streaking of the sputum, dyspnœa, pain in the right side of the chest and some loss of weight. Chest X-ray showed patchy opacities in the right upper lobe. His sputum was T.B. negative but contained malignant cells. He was discharged from hospital and remained well for eight months, when he again complained of cough, blood-stained sputum and pain in the chest. On examination there was early clubbing and chest X-ray then showed partial collapse of the right upper lobe. His sputum was T.B. positive and still contained malignant cells. Bronchoscopy showed narrowing of the right upper lobe orifice. He was treated by bed-rest, P.A.S. and streptomycin, with improvement in his general condition, and was discharged. He remained fairly well for three months, but his symptoms then returned with further loss of weight and general deterioration. He was readmitted and died three weeks later. Post-mortem examination showed bronchial carcinoma of the right upper lobe with widespread secondary deposits. There was caseous tuberculosis of the left upper lobe.

CASE 14

A man aged 59 complained of cough, lassitude and dyspnœa for three years. Recently he had had some retrosternal pain and his sputum had become persistently blood-stained. He also complained of some aching pain in his bones and joints. On examination early clubbing was present and there were signs of consolidation over the right upper lobe. Serial X-rays showed progressive collapse of that lobe. His sputum was T.B. positive. Bronchoscopy showed granulations around the right upper lobe orifice. He was transferred to a sanatorium, but readmitted fifteen months later complaining of increased dyspnœa and cough and loss of 1 stone in weight. Clubbing was more marked and X-rays showed a large thick-walled cavity occupying most of the right upper lobe and containing a fluid level. His sputum was still T.B. positive but also contained neoplastic cells. Bronchoscopy showed a neoplasm in the right upper lobe orifice. He died two months later, and at post-mortem a squamous-celled carcinoma was seen partially blocking the bronchial opening into the cavity and protruding into the cavity itself.

Diagnosis

The occurrence together of bronchial carcinoma and pulmonary tuberculosis with a T.B. positive sputum has been reported on several previous occasions, mainly in the American literature. Thus Fried (1935 a and b) reports three cases, McCorkle *et al.* (1942) one case, Pillsbury and Wassersug (1945) two cases, Fulton and Rollestone (1946) one case, Gerstl *et al.* (1946) five cases, Cohen (1949) three cases, Farber *et al.* (1949) ten cases, and Shefts and Hentel (1950) one case.

Study of these cases and those in the present series demonstrates that in spite of the diagnostic difficulties there was usually some indication of the presence of bronchial carcinoma rather than of pulmonary tuberculosis alone.

The following table summarises points of differentiation which these authors mention and which we have found of value:

Feature	*Pulmonary Tuberculosis*	*Carcinoma of Bronchus*
Age and sex	Slight predominance in female sex: mainly young	Mainly males (ratio about 14 : 1) and over forty.
Symptoms:		
Pain	Seldom prolonged except in the presence of obvious pleurisy	Second only to cough in frequency as presenting symptom: occurs in about half the cases. Often a continuous dull ache.
Hæmoptysis ..	Usually short and sharp	Often prolonged staining of sputum.
Dyspnœa	Not marked except in gross disease	Occurs in about a quarter of all cases.
Foul sputum ..	Very rare except with gross secondary infection	Present in some breaking-down growths.
Signs:		
Clubbing	Rare except with gross secondary infection or empyemata	Occurs in about one-third of all cases.
Arthritis	Very rare	Infrequent, but when occurring with hypertrophic pulmonary osteo-arthropathy is suggestive.

Feature	*Pulmonary Tuberculosis*	*Carcinoma of Bronchus*
Radiological:		
Dense rounded opacity	Regular smooth outline. Seldom rapid change in size	Shape less regular. Outline less smooth. Growth may be slow or very rapid to any size.
Daughter shadows with above type of lesions	Common	Uncommon, but may occur (see Case 11, Fig. 5 *a* and *b*).
Cavity	Smooth lining. Usually thin-walled. If due to breaking-down tuberculoma cavitation often eccentric	Ragged lining to thick-walled cavity.
Hilar opacity ..	Uncommon except in primary complex, which is very rare in carcinoma age group	Frequent presentation of carcinoma, often associated with peripheral collapse or opacity.
Paralysed diaphragm	Very rare, but has been reported in inflammatory conditions	Common late occurrence (indicating inoperability).
Rib erosion over pulmonary opacity	Extremely rare	Almost diagnostic of carcinoma (not necessarily inoperable).
Calcification ..	Common in long-standing tuberculous lesions	Uncommon, but is occasionally seen when growth invades calcified tuberculous focus.

None of the points mentioned in the above table will, on its own, enable a definite diagnosis of carcinoma of the bronchus to be made. They will, however, suggest the diagnosis, and in combination the presumption will be very strong.

Clinical and radiological observation of the course of the case over a period, although obviously not an ideal method of diagnosis, is often informative and, short of thoracotomy, may in a few cases supply the only indication of the true pathology. In general a progressive clinical and radiological downhill course on bed-rest is against pulmonary tuberculosis alone. This suspicion is strengthened if deterioration continues in spite of chemotherapy (streptomycin and P.A.S.). Clinical deterioration and radiological spread of disease in the presence of sputum which has become T.B. negative (without chemotherapy) strongly suggests that pulmonary tuberculosis is not the only disease present.

Probably the most difficult of all differential diagnoses concerns the " tuberculomata " and the rounded neoplasms: this is especially so in the presence of T.B. positive sputum: Moyes (1951 a) states, concerning this problem, that in the presence of a T.B. positive sputum or satellite shadows carcinoma is virtually excluded. With this we do not agree: five of our cases (1, 2, 6, 7 and 11) presented with rounded opacities and positive sputa, and one of them (11) also showed satellite shadows, two of which proved to be secondary carcinomatous deposits.

Suspicion that tuberculoma is not the diagnosis may arise from the presence of any of the features already mentioned, age being one of the most suggestive factors. Moyes (1951 a) in a review of forty-one cases of tuberculoma found the condition commonest in the 17 to 35 age group and his oldest case was 51, whereas carcinoma of the bronchus is uncommon under 40 and the incidence rises to a peak between 51 and 60. Sellors and Hickey (1949) and Moyes (1951 a) found that tuberculomata occur more frequently in women than

men, whereas in carcinoma of the bronchus the sex ratio is about 14 : 1 in favour of men.

Rapid radiological enlargement of the opacity, although not excluding a tuberculoma, is much more common in carcinoma, which may grow to any size, and although very large tuberculomata are reported they are rare, the biggest in Moyes' series being about 2 inches in diameter (Moyes, 1951 b).

When suspicion has arisen that a carcinoma may be present, investigations to establish the diagnosis should be carried out and should include bronchoscopy and examination of serial sputa for malignant cells. If bronchoscopy is negative (about one-third) the presence of malignant cells in the sputum remains the only direct method of diagnosis short of gland biopsy or thoracotomy. Although not widely used, we believe this investigation to be of the greatest value in skilled hands, and in six of our fourteen cases it was positive.

Treatment

Resection is the treatment of choice for bronchial carcinoma, and this is also true if pulmonary tuberculosis is present in addition, providing there is not sufficient tuberculosis in the other lung to contra-indicate operation. Three of our cases have successfully undergone pulmonary resection.

P.A.S. and streptomycin should be used to " cover " the operation, and in less favourable cases a longer preliminary course may bring about sufficient improvement to enable resection to be attempted.

The place of deep X-ray therapy in the " curative " treatment of bronchial carcinoma is still controversial, but it would appear that the presence of pulmonary tuberculosis in addition excludes this form of therapy.

Summary

1. Fourteen cases of bronchial carcinoma in association with pulmonary tuberculosis are reported.

2. Diagnostic points from the literature and from our series are summarised and discussed.

3. The importance of special investigations is pointed out and the possibility of resection in these cases is stressed.

Acknowledgments

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FOOTNOTE

Since this work was prepared we have read an article entitled " Coincident Active Pulmonary Tuberculosis and Bronchial Carcinoma," by B. Couts (1951: *Tubercle*, **32**, 223), who reported four similar cases. We would like to acknowledge that we are in close agreement with many diagnostic points mentioned in this paper.

CANCER OF THE LUNG: A LARYNGEAL AND PHARYNGEAL SYNDROME AS THE FIRST PRESENTING SYMPTOM

By N. Asherson

From the Royal National Throat, Nose and Ear Hospital

Laryngeal and pharyngeal neurological symptoms may precede by a considerable time chest manifestations in a case of carcinoma of the bronchus. Indeed, the disease may run its course with only *terminal* lung symptoms—usually within twelve weeks of the onset of the laryngeal symptoms.

W. L. Harnett (1943), tabulating the relative frequency of symptoms in 1,063 consecutive cases of bronchial carcinoma, gives an incidence of hoarseness as 1·5% (15 cases), and dysphagia or regurgitation 1·8% (18 cases).

The Laryngeal Syndrome

This is always *clinically* overt and detectable on mirror laryngoscopy.

Cancer of the lung—otherwise symptomless and unsuspected—not infrequently presents with the initial symptoms and signs of complete paralysis of one or other, or both, recurrent laryngeal nerves. Such paralysis, even if unilateral (and left-sided, as is usually the case), betrays itself forthwith by an immediate alteration (weakness or huskiness) in the voice. This is associated with a characteristic ineffectual cough, resulting from the inability to approximate both vocal cords completely, when the initial paralysis affects *both* recurrent laryngeal nerves. This also accounts for the difficulty in breathing. As both cords are immobilised in the cadaveric (para-median) position the glottic lumen is reduced to a narrow permanent chink which *may* suffice for adequate respiration at rest, but on exertion or on sudden deep inspiration respiratory stridor is noticeable. Such bilateral abductor paralysis produces hoarseness, inspiratory stridor on exertion and inability to cough normally. The laryngeal paralysis is apparent by mirror laryngoscopy.

The Pharyngeal Syndrome

This is apt to be overlooked clinically unless the symptoms are severe, and may be detectable only in the pharyngogram (the profile X-ray of pharynx after swallowing an opaque bolus). Paralysis of the recurrent laryngeal nerve also affects deglutition. In a unilateral paralysis the sympton may be transient, mild and elicited only on cross-examination: in the bilateral paralysis it is more obvious.

During the terminal stage of deglutition the crico-pharyngeal sphincter is reflexly relaxed to enable the bolus to pass from pharynx to œsophagus, at the same time that respiration is reflexly inhibited to prevent the bolus being aspirated into the air passages.

The recurrent laryngeal nerve innervates this sphincter as well as the muscles of the larynx, so that its paralysis also produces disordered deglutition. This is slight in the case of unilateral but severe in a bilateral recurrent laryngeal nerve paralysis. The disorder is confined to the swallowing of fluids which, if swallowed hastily or in large gulps, precipitates a bout of coughing after a significant latent interval of up to two or three seconds. Solids are swallowed without incident. The patient does not spontaneously complain of this coughing produced by the swallowing of fluids. It must be elicited by questioning. The disorder in swallowing is due to lack of co-ordination of the crico-pharyngeus muscle resulting from its failure to relax synchronously with the act of deglutition. This can be termed achalasia of the crico-pharyngeus (Asherson, 1950). In a case of bilateral recurrent laryngeal nerve paralysis with well-marked disordered deglutition, even solids cannot be swallowed and the dysphagia becomes absolute, as in the case described here. After tracheotomy is performed for the laryngeal obstruction, the swallowed liquid spills over into the trachea. Part is then coughed out of the tracheotomy tube and part trickles down the trachea. Even the constant use of suction through the tracheotomy tube will fail to prevent the patient ultimately succumbing to an inhalation pneumonia.

The Pharyngogram of Achalasia of the Crico-pharyngeus

There is a " hold-up " of the opaque swallow in the hypopharynx and pyriform fossæ. The overflow fills the valleculæ, visible in the antero-posterior view by its horizontal fluid level. It may take up to five minutes for the pharynx to empty completely. In an extreme case (as recorded below) the dysphagia is complete.

The swallowed opaque bolus fills the hypopharynx and pyriform fossæ, overflowing to spread out and stagnate over the glottis and in the valleculæ. Mirror laryngoscopy and radiology will demonstrate this widespread stagnation. So constant is this radiological pharyngeal picture of achalasia of the crico-pharyngeus that I have come to look upon this pharyngogram as pathognomonic of recurrent laryngeal nerve paralysis. Identical pharyngograms have been secured by me in nine consecutive cases of recurrent laryngeal nerve paralysis, three of which were bilateral. Achalasia of the crico-pharyngeus is produced by *any* lesion breaking the neuro-muscular reflex controlling the pharyngeal stage of deglutition (Asherson, 1950).

Case Summary.—An adult male with loss of voice following a cold: inspiratory stridor: noticed that while solids were swallowed easily, swallowed liquids produced coughing—" it went the wrong way." There was loss of weight and a secondary anæmia: paralysis of both recurrent laryngeal nerves on mirror laryngoscopy: pharyngogram revealed achalasia of the crico-pharyngeus. Clinical and radiological examination (repeated) showed no chest physical signs. There were no neurological signs. Bronchoscopy and œsophagoscopy proved negative: sputum negative. Emergency tracheotomy for respiratory obstruction.

The achalasia of the crico-pharyngeus resulted in all swallowed liquids being coughed out of his tracheotomy tube: death twelve weeks latter: post-mortem revealed a carcinoma of the left upper lobe bronchus.

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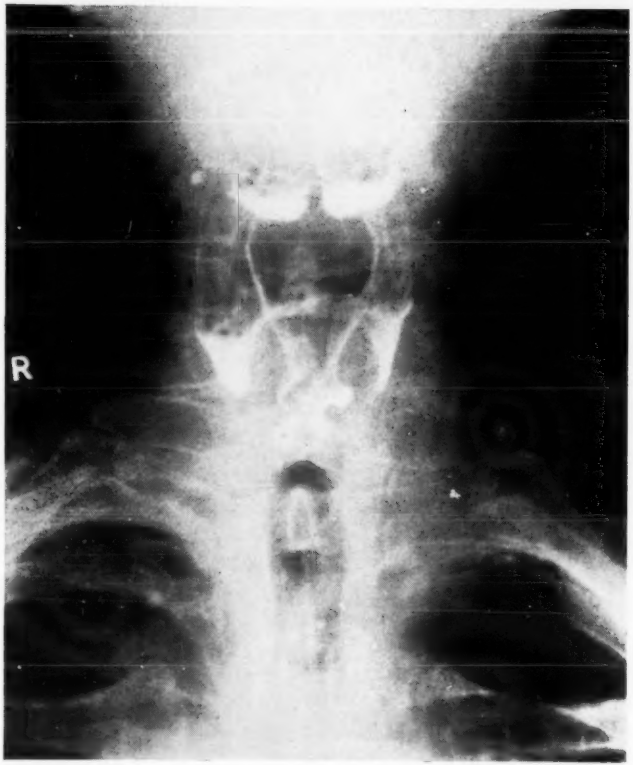

FIG. 1.—Antero-posterior pharyngogram. Note: delayed emptying of the opaque meal which stagnates in the pyriform fossa and in the valleculæ, with fluid levels there.

FIG. 2.—Profile pharyngogram. Achalasia of the crico-pharyngeus.

PLATE XIII

CASE RECORD.—A male aged 65 suddenly lost his voice and when examined six weeks later was found to have a bilateral laryngeal nerve paralysis, with both vocal cords immobilised in the para-median position. There was marked inspiratory stridor at rest. He was dyspnœic. He also complained of difficulty in swallowing liquids, which precipitated a bout of coughing after a latent interval of a few seconds. He could swallow solids easily. There was a loss in weight; his blood count was 3·5 million reds with 79% hæmoglobin. A mediastinal neoplasm was suspected, but clinical and radiological examination revealed no lesion. A profile view of the pharynx after an opaque swallow showed a typical hold-up above the crico-pharyngeus, with sloping away of the larynx and overflow into the valleculæ, both of which were filled with the opaque cream, displaying a fluid level. This is the typical pharyngogram of an achalasia of the crico-pharyngeus. There was no obstruction in the œsophagus. (Figs. 1 and 2.)

Operation.—Bronchoscopy and œsophagoscopy disclosed no pathology. A tracheotomy was performed for the laryngeal obstruction.

For the following ten days breathing was normal. He was given Distaquaine 300,000 units twice daily and chloromycetin, vitamin C and iron. Repeated suction through the tracheotomy tube was practised, as swallowed fluid (and later solid particles of food as well) passed into the trachea and was coughed out through the tube. Feeding was by gavage, but this was ill-tolerated, as the presence of the tube produced secretions which trickled over into the trachea. (An ideal œsophageal tube for such a case should be fluted or perforated to enable saliva to enter the œsophagus.)

Week 2.—Œsophageal tube produced œdema of the arytenoids and was withdrawn. Food and water swallowed was immediately coughed out through the tracheotomy.

X-ray showed no œsophageal lesion or œsophago-tracheal fistula.

Week 3.—Temperature raised: rigor: pulse 130 ?, respirations up to 40.

Patient collapsed and appeared *in extremis*, but responded to vigorous, continuous suction, via the tracheotomy tube, of the depth of the trachea and bronchi; secretions in the mouth were aspirated away, using a tonsil sucker end.

The dramatic response was attributed solely to the effective suction.

All this while repeated clinical and radiological chest examinations failed to disclose a neoplasm. The condition was treated as a case of idiopathic bilateral complete paralysis of the recurrent laryngeal nerve producing a bilateral abductor paralysis of the vocal cords and achalasia of the crico-pharyngeus. Drastic measures were resorted to in the sixth week to prevent the patient succumbing to an inhalation pneumonia. These measures were of surgical interest only and included gastrostomy, etc.

He became progressively more anæmic, in spite of blood transfusions and iron by mouth, and finally succumbed to an inhalation pneumonia three months after the onset of the laryngeal paralysis.

Autopsy revealed the lesion to be a carcinoma of the left upper lobe bronchus, non-obstructive, extending into the lung and encircling the trachea posteriorly, where both recurrent laryngeal nerves were involved.

I am indebted to Dr. T. V. Critchlow for the radiographs.

Comment

The incidence of a paralysis of the recurrent laryngeal nerve in neoplasm of the lung or mediastinum is such that this cause of the paralysis must be

vallecula, with fluid levels there.

assumed in the absence of a thoracic aneurysm or any growth adjacent to the larynx (sub-glottic) or œsophagus (post-cricoid and upper third), all of which can be easily diagnosed by the ancillary methods of examination.

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SOME OBSERVATIONS OF THE BRONCHIAL ARTERIES IN LOBAR PNEUMONIA AND PULMONARY INFARCTION

By Leon Cudkowicz*

From the Department of Medicine, Postgraduate Medical School, London

The reduction in arterial oxygen saturation in lobar pneumonia to levels near 70% (Stadie, 1922) is believed to be the result of reflex shallow breathing which follows the obstruction of pulmonary arterioles (Dunn, 1920, and Binger and others, 1924). Occlusive changes in the pulmonary arterioles of consolidated lobes were demonstrated radiographically in autopsy specimens by Gross (1919). In histological studies carried out before the advent of sulphonamide therapy Kaufmann (1929) recognised very congested vessels in the stage of red hepatisation, and thrombosis of some of these vessels in the stage of grey hepatisation. In a study of the circulation in distemper broncho-pneumonia in dogs, Mathes *et al.* (1930) observed occlusion of the pulmonary arteries. The capillaries and the bronchial arteries in the affected areas were, however, widely dilated and patent. Occlusive changes in the pulmonary arteries in lobar pneumonia appear to be accepted, but the behaviour of the bronchial arteries is less well understood.

Virchow (1856) found that the occlusion of the pulmonary artery to one lobe did not lead to necrosis of that lobe, and he concluded that the bronchial arteries maintained its viability. Compensatory dilatation of the bronchial arteries was seen in experimental pulmonary embolisation (Ghoreyeb and Karsner, 1913; Steinberg and Mundi, 1936). Karsner and Ash (1912) contended that a fall in pulmonary artery pressure and a reduction in pulmonary artery blood flow resulted in compensatory augmentation of the bronchial circulation.

The present study concerns the appearances of the bronchial arteries in post-mortem lungs, in which evidence was found of consolidation or infarction in one lobe or a part of one. The method of study and the technique of injecting the bronchial circulation has been published elsewhere (Cudkowicz and Armstrong, 1952). The radio-opaque medium which was used did not traverse vessels of less than 60 μ in diameter, and the fixation properties of the medium allowed for easy recognition of the injected arteries in ordinary histological sections.

Material

No.	*Sex*	*Age*	*Clinical Diagnosis*	*Post-mortem Diagnosis*
1	M.	55	Hypertensive heart failure. Left lower lobar pneumonia	Bilateral emphysema. Left lower lobe pneumonia in the stage of red hepatisation. Both ventricles enlarged.
2	M.	67	Consolidation of left lower and right upper lobes	Right upper lobe in stage of grey and left lower lobe in stage of red hepatisation.

* In receipt of a grant from the Medical Research Council.

No.	*Sex*	*Age*	*Clinical Diagnosis*	*Post-mortem Diagnosis*
3	F.	74	Right lower lobe pneumonia	Consolidation in stage of grey hepatisation.
4	F.	40	Mitral stenosis and repeated pulmonary infarcts	Infarction of posterior half of right lower lobe.
5	F.	28	Mitral stenosis, pulmonary hypertension and pulmonary infarction	Infarction of some basal segments on both sides with occluded pulmonary arteries in same areas.
6	F.	49	Mitral stenosis	Small infarct in left lower lobe.

Results

The Bronchial Arteries in Lobar Pneumonia

During the early phase of lobar consolidation these arteries appeared to be blocked proximal to the affected lobe and failed to become outlined by the injection medium (Fig. 1). With the advent of grey hepatisation their patency was restored and they were once more normally distributed throughout the consolidated lobe. The microscopy in the stage of red hepatisation showed intense congestion of both the pulmonary and bronchial arterioles near the alveoli. Their lumina were blocked with red blood corpuscles suspended in fibrinous fibrils which adhered to the intima.

Fig. 2 shows the changes seen in bronchial arterioles in an interlobular septum near consolidated alveoli. In the subsequent stage of grey hepatisation the bronchial arterioles in corresponding positions were patent and filled with the injection medium (Fig. 3). The pulmonary arterioles throughout remained occluded.

The Bronchial Arteries in Pulmonary Infarction

The radiography of lungs which showed evidence of infarction revealed broncho-pulmonary anastomoses with retrograde filling of the distal branches of the pulmonary arteries in the infarcted areas. Fig. 4 shows occlusion of the proximal trunk of the pulmonary artery to the right lower lobe. The distal branches were patent and became heavily injected through the bronchial arteries. Fig. 5 indicated that the left pulmonary artery tree in case 4 was also outlined by widespread broncho-pulmonary anastomoses. The histology of the infarcted lobes showed extravasation of red cells into the alveoli, and

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PLATE XIV.

Fig. 1.—Case 1. Radiograph of Both Lungs showing

(1) Normal bronchial arteries to the right lower lobe.
(2) Constricted bronchial arteries to both emphysematous upper lobes.
(3) Failure of the bronchial arteries to reach the consolidated left lower lobe. (Red hepatisation.)

Fig. 2.—Case 1. Photomicrograph of Consolidated Lobe showing

(1) Alveoli congested with preponderance of red cells.
(2) Carbon particles in interlobular septa.
(3) Congested and uninjected bronchial arterioles.

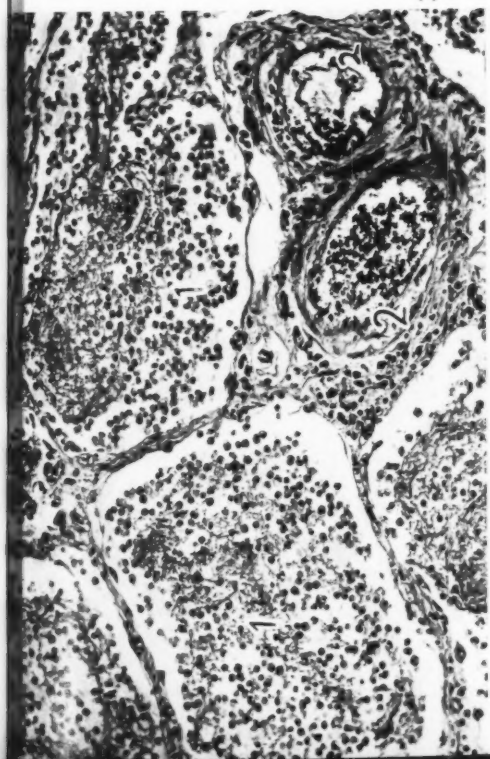
Fig. 3.—Case 2. Photomicrograph of Section from Right Upper Lobe.

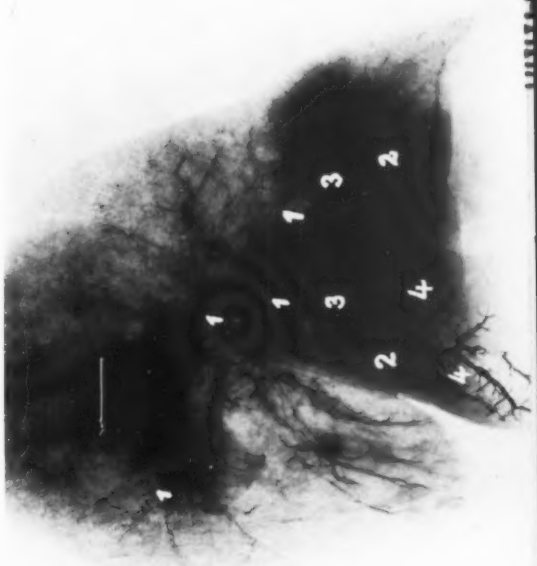
(1) Alveolar exudate predominantly polymorphonuclear.
(2) Dilated bronchial arterioles injected with bismuth granules.

Fig. 4.—Case 4. Lateral Radiograph of Right Lung. (Hilum Faces X-ray Tube.)

(1) Bronchial arteries.
(2) Infarcted areas in lower lobe.
(3) Occluded pulmonary artery.
(4) Patent pulmonary artery in periphery of infarct.

PLATE XIV





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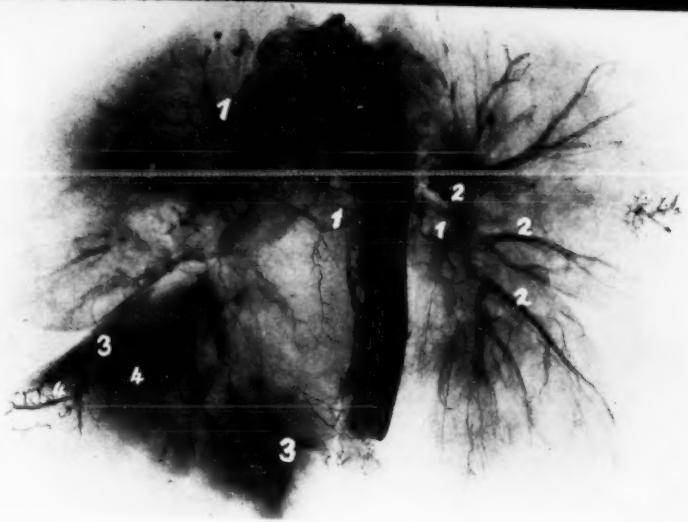

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6

1. Fig. 1.—Case 1. (quarter of normal)
2. Fig. 2.—Case 1. (×143)
3. Fig. 3.—Case 2. (×143)
4. Fig. 4.—Case 4. (quarter of normal)
5. Fig. 5.—Case 4. (quarter of normal)
6. Fig. 6.—Case 4. (×15)
7. Fig. 7.—Case 4. (×41)

References in the illustrations are shown at the foot of each facing page.

thrombosis of the larger pulmonary arteries. The thrombosed pulmonary artery lumina everywhere were partly recanalised by the injected vasa vasora. These arterioles, which are normally present in the adventitiæ of the pulmonary arteries, are branches of the bronchial arteries. They were dilated and conveyed the injection medium into the recanalised channels in the pulmonary arteries (Fig. 6). At the periphery the pulmonary artery lumina were patent and filled with the injection mass which had entered them by communicating vasa vasora (Fig. 7). No other type of broncho-pulmonary anastomosis was seen in these lungs.

Discussion

The lung is an organ which possesses a dual circulation. The bronchial arteries are concerned with the nutrition of most pulmonary structures and in particular the bronchi, pulmonary arteries and nerves, the visceral pleura and the collagenous supporting framework of the alveoli (Miller, 1947; Cudkowicz, 1950). Normally the two circulations have no pre-capillary anastomoses. Capillary anastomoses may exist, but have so far not been demonstrated. Both circulations have different functions under normal conditions, but in lung disease they undergo complementary changes. In lobar pneumonia both systems appear to be occluded during the stages of congestion and red hepatisation, but during the grey stage the bronchial circulation opens up once more and carries oxygenated blood to the inflamed lobe. The mechanism of this restoration of the bronchial circulation is not understood, but it might follow the simultaneous reduction in pulmonary blood flow to the consolidated lobe, as suggested by Karsner and Ash (1912). The anoxia associated with lobar pneumonia is therefore aggravated by the additional volume of venous bronchial blood which ultimately reaches the pulmonary veins from the consolidated lobe. Towards the stage of resolution of an uncomplicated lobar pneumonia patency of the pulmonary arteries ensues, probably as a result of recanalisation of the proliferating vasa vasora. Persistence of broncho-pulmonary pre-capillary anastomoses was seen in pulmonary infarction associated with occlusion of the proximal trunks of the pulmonary arteries to the involved area. In this condition a considerable volume of bronchial arterial blood is diverted from its normal destination to the very much larger pulmonary artery bed. It is feasible that this diversion of bronchial blood flow leads to ischæmia

PLATE XV.

FIG. 5.—CASE 4. RADIOGRAPHS OF BOTH LUNGS SHOWING
(1) Bronchial arteries.
(2) Left pulmonary artery which has filled retrogradely.
(3) Pulmonary infarct in right lower lobe.
(4) Retrograde filling of the patent pulmonary artery in the periphery of the infarcted lobe.

FIG. 6.—CASE 4. PHOTOMICROGRAPH AT PERIPHERY OF PULMONARY INFARCTION.
(1) Pulmonary artery with occluded lumen.
(2) Dilated vasa vasora in communication with recanalised lumen conveying the injection medium.
(3) Normally bronchial arteries in the walls of large bronchi.
(4) Extravasation of red cells into alveoli in infarcted area.

FIG. 7.—CASE 4. PHOTOMICROGRAPH OF PULMONARY ARTERIOLE AT PERIPHERY OF INFARCTED AREA.
The lumen is patent and filled with the injection medium. Patent vasa vasorum are still in communication with the arteriole (A).

of the intra-pulmonary structures for which it is normally intended, and causes permanent hæmodynamic changes in the pulmonary circulation.

Liebow *et al.* (1949) demonstrated broncho-pulmonary anastomoses with the aid of a cast technique in bronchiectasis. They regarded " pneumonitis " as a prerequisite stage in the pathogenesis of bronchiectasis, and thought that inflammatory reactions in the lung parenchyma led to the proliferation and ultimate fusion of the patent vessels of both systems. It would appear that failure of the pulmonary arteries to regain their patency after ordinary lobar pneumonia, or occlusive pulmonary artery changes following pulmonary embolisation, initiates dilatation and proliferation of the vasa vasora into the lumina of the pulmonary arteries and thereby establishes the broncho-pulmonary anastomoses seen in bronchiectasis. With the diversion of the bronchial circulation from the peripheral bronchi and its other lung structures occlusive changes in the peripheral bronchial arteries, as for instance in those which supply the visceral pleura, small bronchi and interlobular septæ, can be demonstrated (Cudkowicz and Armstrong, 1952). These ischæmic factors may be of some importance in diminishing the vitality of these structures and play a part in the genesis of bronchiectasis, lung abscess, empyema and pulmonary emphysema and fibrosis. For the same reason the presence of broncho-pulmonary anastomoses seen in patients with mitral stenosis, who had episodes of pulmonary infarction, might explain the presence of widespread alveolar thickening and fibrosis, and the altered hæmodynamic state of the pulmonary circulation which cannot be the result of the mitral valve stenosis alone.

Summary

The bronchial arteries were studied in autopsy lungs which showed evidence of lobar pneumonia and pulmonary infarction. The essential differences in behaviour of these vessels in the two conditions has been described. The significance of broncho-pulmonary anastomoses which persist after pulmonary artery occlusion has been discussed.

I desire to thank Professor J. McMichael and Dr. C. V. Harrison for the provision of facilities in their respective departments, Dr. J. B. Armstrong for his help with the study of the pneumonia lungs, and the technical staff of the Departments of Medicine and Pathology for their assistance. Mr. E. V. Willmott, F.R.P.S., produced the photomicrographs.

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PATHOGENESIS OF TUBERCULOSIS OF THE FEMALE GENITAL ORGANS

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In recent years the investigation of infertility has become an important part of the routine work of the gynæcologist. Endometrial biopsy has been performed in a large number of cases, and this led to the discovery that about 5 per cent. of sterile women have tuberculous endometritis (Sharman, 1943, 1947; Sutherland, 1943, 1951). Most of these women feel perfectly well and have no gynæcological symptom except sterility, as the following example shows:

A woman aged 23 complained of infertility after two and a half years of marriage. She had no other symptoms and no significant past history. At biopsy tubercles were found in the endometrium, and injection of endometrial fragments caused tuberculosis in a guinea pig. A salpingogram showed that the right tube was patent, but the left was blocked at the abdominal end. A radiograph of the chest showed no abnormality. She was treated with streptomycin and PAS. A year later she was well, and subsequent biopsy showed no abnormality, nor could tubercle bacilli be grown.

A second example shows that there may be no symptoms in some more advanced cases of tuberculous salpingitis:

The patient was 32 years old and complained of ten years' infertility. She felt well and had no other complaint. There was no significant past history of illness. Endometrial biopsy showed no abnormality, but some tubal thickening was felt and a salpingogram showed that both tubes were blocked. A radiograph of the chest showed healed tuberculous lesions at both apices. At laparotomy the left tube was found to be completely disorganised, and there was a small right pyosalpinx with tubercles on the adjacent peritoneum. Section confirmed the diagnosis of tuberculosis. Recovery was uneventful after removal of the tubes.

Such cases are not rare, and have put us on our guard against "silent" pelvic tuberculosis. This article reviews some opinions which have recently been expressed about the spread of tuberculosis to and from the pelvic organs, and includes a few observations based on 38 recent cases seen in King's College Hospital. I am grateful to my senior colleague, Mr. J. H. Peel, for permission to include some of his cases.

The Initial Site of Pelvic Infection

Until recently we believed that the uterine (Fallopian) tube was the initial site of infection of the pelvic organs with tuberculosis, but the discovery of symptomless tuberculous endometritis makes us reconsider this. A diagnosis of primary endometrial tuberculosis can be accepted only if both tubes and uterus are examined histologically. In every case of tuberculous endometritis that we have seen in which the tubes were fully investigated they were found

to be abnormal (10 cases). On the other hand, in many cases in which the uterus was removed with tuberculous tubes the disease was found to be confined to the tubes. Greenberg (1920) studied 200 cases of tuberculous salpingitis and in 18·5 per cent. of these there was no uterine, ovarian or peritoneal disease and the tube was obviously the initial site of infection. In all the other cases other structures were involved, so that the initial site of infection was less certain. The ovary was infected in 26·5 per cent. of cases, but never alone, and it is probable that ovarian tuberculosis is nearly always a sequel of tubal infection.

Sutherland (1951) found that the endometrium was more often infected than the tubes, but his figures were obtained by studying the records of other surgeons, and " the tubes were not histologically examined in the majority of the endometrial cases." He stated himself (1943) that 16 out of 20 cases of tuberculous endometritis had blocked tubes, and Sharman (1947) found blocked tubes in 61 per cent. of such cases. Even tubal patency does not entirely exclude disease; Russell, Jackson and Midgley (1951) have shown that the tubes may be patent in the early stages of tuberculous infection. Though Erikson (1947) presented good evidence for the occasional occurrence of primary endometrial tuberculosis, we still regard the tube as the usual initial site of infection. The distinction between tubal and endometrial tuberculosis may be somewhat artificial; the tubal mucosa is continuous with the endometrium and tubal secretion passes into the uterus as long as the tube is patent. Both in the tube and the uterus the initial infection is in the epithelium, not in the muscle. The endometrium has the advantage that it is shed monthly, except for the basal layer, and early tuberculous foci may be shed with it.

The Type of Bacillus

The type of infecting organism has not often been investigated. Sutherland (1943) cultured the bacilli from 4 cases of uterine tuberculosis and found that they were of the human type in 3 cases and bovine in 1. In 4 cases in the present series the bacilli were all of the human type.

The Route of Infection

If it is accepted that the usual site of initial infection of the genital organs is the tubal mucosa, or less often the endometrium, then we must ask how the bacilli get there. Three routes might be considered: (1) by ascending infection from the lower genital tract, (2) by spread from the peritoneal cavity, and (3) by the blood stream from some remote focus in the lungs, lymphatic glands or elsewhere.

All the evidence is against the first possibility, in spite of the fact that it is the usual route of infection with gonococci and streptococci, when these organisms gain entry from a lesion of the cervix or placental site. No such portal is found in the tuberculous cases. Tuberculosis of the cervix, vagina or vulva is very rare and nearly always secondary to advanced tubal or uterine disease. It is not denied that rare cases of primary tuberculosis of the cervix or vulva have occurred (Stevenson, 1938; Tasche, 1940; Benjamin and Charnock, 1949; Nilson, 1947), But in most of the cases described in the past there was no histological examination of the uterus and tubes, and it can safely be

said that ascending tuberculous infection of the tubes has not been proven. Although cases of infection of the vulva or cervix have been reported after intercourse with a male suffering from genito-urinary tuberculosis, this is certainly not the usual mode by which the tubes and uterus are infected.

We may now turn to the other possibilities—those of infection from the peritoneum or from the blood stream. A review of the histories of these cases may help us. Among 28 cases of pelvic tuberculosis in which full clinical and histological data was available the following past histories were found:

Pulmonary tuberculosis (still active in 2 cases)	1
Pulmonary tuberculosis with enteritis	2
Tuberculous peritonitis	2
Appendicectomy followed by tuberculous fistula	1
Tuberculosis of elbow	1
" Tuberculous ulcers "	1
Previous laparotomy for " inflammation," brother suffering from tuberculosis	1
Husband suffering from pulmonary tuberculosis	1
	10 (36%)

The following histories were noted in Russell, Jackson and Midgley's review (1951) of 40 cases:

Pulmonary tuberculosis (still active in 3 cases)	8
Pleural effusion	2
Tuberculous peritonitis and pleural effusion	2
Tuberculous peritonitis	4
Tuberculous peritonitis and tuberculosis of foot	1
Tuberculosis of the spine	1
Tuberculosis of the hip	1
Erythema nodosum	2
	23 (57%)

A complementary investigation is to find out how many women with other forms of tuberculosis develop pelvic lesions. Whitehouse (1935) stated that the pelvic organs were infected in 5 per cent. of women who had died from other forms of tuberculosis. O'Driscoll (1951) examined 25 women who were being treated for pulmonary tuberculosis in a sanatorium and found 6 cases of genital tuberculosis, all of which were proven by histological examination of the endometrium or tubes. In a similar investigation Lackner, Schiller and Tulsky (1940) found 2 cases of pelvic infection among 15 cases.

Conversely, Sutherland (1951) found active pulmonary tuberculosis in 4 out of 69 cases of genital tuberculosis, and healed lesions in 11 of these cases. Many other reports give a higher incidence of pulmonary disease, but these reports are from continental countries in which the general incidence of tuberculosis may be different. Among the 38 cases studied for this paper active pulmonary tuberculosis was found in 3 cases and healed lesions in 6 cases. These figures agree with Sutherland's. Unfortunately it is often impossible to tell how long disease has been present in either the lungs or the pelvic organs, so that the precise time and sequence of spread is uncertain.

Does Tuberculous Salpingitis cause or follow Tuberculous Peritonitis?

These observations show how often pelvic tuberculosis follows or appears as a complication of other tuberculous lesions. Some authorities have held that

the infection is blood borne from these distant foci in all cases, but direct spread to the tubes is an obvious possibility in cases of tuberculous peritonitis. In the histories listed above it will be seen that tuberculous peritonitis appears nine times. Is the tube infected from the peritoneum, or the peritoneum from the tube? Probably both events occur, though conclusive evidence is hard to find.

When some cases of tuberculous ascites are explored small tubercles are seen studded over the peritoneal surface of the tubes, but the tubal peritoneum is not more affected than the rest of the peritoneum and the tubes look healthy in other respects. Presumably complete resolution may occur, but the ciliary action of the tube must carry some of the fluid into the lumen, so that tubercle bacilli might become implanted. In the cases with a past history of tuberculous peritonitis listed above, the intervals between the diagnosis of peritonitis and salpingitis were 29, 21, 10, 9, 8, 7, 7, 5 and 3 years. Although we know that tuberculosis may be latent in the tube for several years, most of these intervals are too long to give this theory much support.

On the other hand, both clinical observation and examination of the pelvic organs at laparotomy suggest that some cases of generalised tuberculous peritonitis are secondary to tubal lesions. It is common to find a tuberculous pyosalpinx, which has obviously been present for some time, with small recent tubercles scattered over the adjacent peritoneum. Russell, Jackson and Midgley (1951) wrote: " Consideration of patients of all ages and both sexes who have been admitted to Hawksmoor Sanatorium in the past fourteen years suggests that there is a twofold etiology of acute general tuberculous peritonitis with ascites. In childhood there is no difference in sex incidence and presumably the condition has the same cause in boys and girls. From adolescence onwards, however, we have no record of a new male case. This strong female preponderance . . . suggests that acute generalised tuberculous peritonitis in the adult female may be due to some cause peculiar to the sex and may result from spread of infection from the genital organs." In fairness it must be added that these authors do not maintain that this is the *invariable* course of events, and they report two cases associated with pregnancy in which some other mode of infection was probable. But their statement that new cases of tuberculous ascites do not occur in the male after adolescence must not be accepted without question. Of the last 25 cases of tuberculous peritonitis indexed at King's College Hospital, 14 were male and 11 were female. Difficulty arises because the term " acute generalised tuberculous peritonitis " is only a description of the chief feature of a case; ascites may complicate the late stages of cases in which the initial lesion was not in the pelvic organs. Seven of the male cases (aged 14, 17, 20, 29, 52, 57 and 76) and one female case (aged 28) had active pulmonary disease, renal disease or miliary tuberculosis. The ages of the remaining male cases were 1, 4, 8, 16, 17, 17 and 18. The ages of the remaining female cases were 1,10, 17, 18, 18, 20, 24, 27 and 55. It is difficult to draw a definite conclusion from these figures; it would be of interest if those who see larger numbers of these cases would investigate them with this point in mind.

In determining whether tuberculosis spreads from the tubes to the peritoneum or *vice versa* the type of bacilli should be investigated. As already noted above, the bacilli found in the tubes and endometrium are usually (though not

invariably) of the human type; those found in tuberculous peritonitis are usually bovine.

Relation to Tuberculosis of the Urinary Tract

In the female the urinary tract is less closely related to the genital organs than in the male, and for this reason it is uncommon to find concurrent genital and urinary tuberculosis in women. Greenberg (1920), for example, found that the urinary tract was infected in only 4 out of 200 cases of tuberculous salpingitis. Among the cases studied for this paper no instance of urinary tuberculosis was found, although every case with urinary symptoms was completely investigated.

The Spread of Infection from the Initial Pelvic Lesion

Tuberculosis of the tube or endometrium not uncommonly spreads to the ovaries, myometrium, pelvic peritoneum, and very rarely to the lower genital tract. Gut may become adherent to the infected organs, and tuberculous fistulæ may be formed, both spontaneously and as a result of surgical injury. We have already discussed the possibility of generalised tuberculous peritonitis originating from infection of the genital organs, but we must also ask how often spread to other remote organs occurs. Russell, Jackson and Midgley (1951) mentioned a case of tuberculous meningitis and Lawlor (1946) one of miliary tuberculosis which appeared to follow pelvic tuberculosis. Sutherland (1943) followed 28 cases of pelvic tuberculosis and noted that 2 patients developed tuberculosis of the spine and 2 others active pulmonary tuberculosis. It is seldom possible to be sure that such widespread infections originated from the pelvic lesions, as a small pre-existing focus in the lung or a lymphatic gland might have been overlooked, and there is always the possibility of re-infection.

The "Silent" Case

The clinical features and serious nature of the cases with gross pathological changes are well known and need no mention here, but a few remarks may be added about the symptomless cases discovered in the infertility clinic. Most of these women feel well and it is difficult to convince them that they require prolonged investigation and treatment—which must occasionally be radical. A radiograph of the chest is essential in every case.

The diagnosis is sometimes doubtful. Any history of an illness which might have been tuberculous, or of contact with an active case of tuberculosis, may be significant. In a suspicious case not only should the endometrium be examined and tubal patency tested, but guinea-pig inoculation of endometrial fragments should also be arranged. Tubercle bacilli can sometimes be demonstrated by Ziehl-Neelson staining, but probably only in cases in which the histological evidence of tuberculosis is clear. I have no experience of other bacteriological methods such as culture of menstrual lochia, but in one case tubercle bacilli were demonstrated in the cervical secretion, showing that bacilli are certainly excreted from the uterus.

We do not know how many of these cases progress. Russell, Jackson and Midgley (1951) wrote: "A follow-up of cases of infertility for up to eight years has shown that for the most part they remain in good health without any treatment," and my own more limited experience supports this. The same

writers point out how rarely tuberculous endometritis is found at ages near the menopause, when curettage is most often performed, which suggests that many of the cases that occur in younger women heal spontaneously. In Sutherland's collected series (1951) there were only eight post-menopausal women among 369 cases. Among 38 cases reported here all the patients were aged between 18 and 43, except one woman aged 49. But tuberculosis is always a serious diagnosis, and even if only a few of these cases progress they must all be followed carefully for a long time.

If there are tubal lesions there is almost no hope of subsequent pregnancy. Even though endometrial lesions appear to heal (as in the first case described above), most of these cases have tubal disease as well. In Sutherland's comprehensive review of the literature he mentions only 4 cases of uterine pregnancy following genital tuberculosis (Eriksen, 1947; Bédrine, 1948), although he mentions other reports of puerperal pelvic tuberculosis and of ectopic pregnancy in tuberculous tubes. Russell, Jackson and Midgley (1951) report 2 cases of tuberculous peritonitis in association with pregnancy, and 2 fatal cases of tuberculous meningitis which occurred soon after abortion, in both of which genital tuberculosis was found at post-mortem examination. But such cases are evidently very rare, and the last authors concluded that " in not a single instance has tuberculous salpingitis been diagnosed first and a pregnancy occurred later." Whether the newer antibiotics can alter this gloomy prognosis for these early cases remains to be seen. In the more advanced cases the tubes are so disorganised that restoration of function is impossible.

Summary

The discovery that about 5 per cent. of infertile women have genital tuberculosis, often involving the endometrium, leads to a reconsideration of the pathogenesis of this disease. The route of infection of the genital organs is discussed including the relation of tuberculous salpingitis and peritonitis. The diagnosis and prognosis of the " silent " case are described.

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SYMPTOMLESS CIRCUMSCRIBED INTRATHORACIC OPACITIES

AN ANALYSIS OF FIFTY-SIX CONSECUTIVE CASES

By Gordon Cruickshank
From the Leicester Chest Unit

The advent of mass radiography has brought with it many new problems; not the least of these is to decide the attitude to be adopted towards the treatment of a circumscribed intrathoracic opacity in a patient who is completely free from symptoms.

The purpose of this paper is to describe a series of fifty-six such cases which have been seen and treated by the author and his colleagues in the two-year period from January 1, 1950, to December 31, 1951. The great majority of these cases have been referred by the Mass Radiography Units operating in the Leicester, Derby and Lincoln areas; only a very few represent chance findings during investigation in general hospitals for non-thoracic conditions. All the patients in this series were either completely free of symptoms or only admitted to trivial symptoms on close questioning.

Fifty-two cases were investigated fully. Of the remaining four, two refused investigation, one awaits exploratory thoracotomy and the fourth is unsuitable for exploration on medical grounds. In the fifty-two cases, diagnosis was confirmed by operation in forty-three instances.

The low incidence of " tuberculomas " in this group of cases will be noted; these were largely excluded from the series, but we encountered several cases of solitary round foci in symptomless patients which on routine investigation were found to be tuberculous. Five " tuberculomas " are incorporated in the series, since investigation did not yield a definite diagnosis, and the possibility of malignancy existed.

The Problem

At the outset it is pertinent to state clearly the problem which is posed by this group of cases, and there is only one—that of arriving at an accurate diagnosis. By this is inferred a truly accurate diagnosis, and not only an estimate of what any given opacity is likely to be on a basis of its radiological appearance, the position in the chest, or other such premises. It has been the custom of many radiologists to state categorically that such and such a tumour is a " neurofibroma " or a " bronchogenic cyst " or a " peripheral adenoma," and it has equally become a commonplace to accept such statements as being accurate. In fact, such statements represent merely an opinion; a precise diagnosis can only be made by microscopic examination.

It is equally fair to say that a regrettable attitude of *laissez-faire* is widespread with regard to the chance finding of an intrathoracic opacity in a symptom-free patient. The attitude is taken that because the patient has no symptoms the opacity must be quite harmless both as regards the present and

the future. Contrast this state of affairs with the chance finding of an intra-abdominal mass, which at once leads to a full investigation, possibly ending with an exploratory laparotomy.

Having regard to the high degree of safety which has been reached in thoracic surgical procedures at the present day, there can be no reasonable doubt but that a full investigation of every symptomless intrathoracic opacity is demanded on the knowledge of its presence alone.

That operation is necessary in a large proportion of cases is not denied, but with exploratory thoracotomy as the safe operation it now is, this need be a matter of little concern.

In the present series every reasonable attempt was made to reach an accurate diagnosis without operation, but this was possible in only a small number of cases. A reasonably accurate pre-operative diagnosis was reached in most cases, and while increasing experience brings increasing accuracy it is well to remember that the microscope remains the only true arbiter.

"Telling the Patient"

The position of the patient who is suddenly told that he has a "shadow" in his chest demands careful consideration. I believe it is imperative that the problem posed by the finding of such a shadow should be clearly put before the patient at the earliest possible moment. A great many patients at once jump to the conclusion that they have tuberculosis. When possible, reassurance on this point should be the first step. Following this it is necessary to point out the importance of discovering the precise nature of the opacity, because of the dangers of malignancy, infection or progressive increase in size.

I believe it was John Alexander who said, "There is no such thing as a *good* tumour," and this forms a convenient starting-point in many instances.

When the patient has a clear idea of the situation there is seldom any difficulty in having him submit to investigation. In only two instances in this series was investigation refused.

Methods of Investigation

A complete physical examination is carried out in all instances, and sometimes may yield a clue as to the diagnosis. Sputum examinations, E.S.R. and similar investigations are routine. Antero-posterior and lateral radiographs are essential and the value of a barium examination in any suspected mediastinal pathology should not be forgotten. Lastly, tomography and bronchography may be required.

Bronchoscopy, generally speaking, has a very limited value in this type of case. Although indications for its employment do arise, it is unnecessary to carry it out as a routine.

Diagnostic pneumothorax: This method had considerable vogue at one time, but as it serves only to differentiate intra-pulmonary from extra-pulmonary masses, has now only a very limited usefulness.

Diagnostic pneumoperitoneum is a method of very great value in connection with masses in the region of the diaphragm. It at once serves to differentiate opacities having their origin below the diaphragm from those situated within the thoracic cavity. It was employed in fifteen cases in the series, and its

FIGS. 1 and 2.: Ganglioneuroma with central malignant change (Case 2).

FIGS. 3 and 4.: Extralobar sequestration with calcification and tuberculous infection (Case 3).

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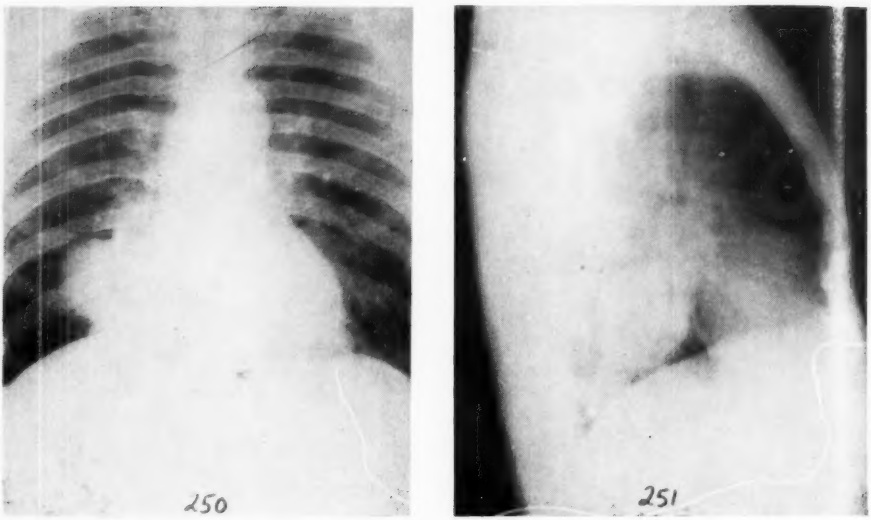

FIGS. 5 and 6.: Malignant bronchial adenoma with invasion of glands (Case 4).

FIG. 7.: Specimen from Case 4 showing glands involved with growth.

To face page 111

chief value was in demonstrating on eight occasions the presence of a herniation of the liver on the right side, and thus eliminating the need for exploratory thoracotomy.

In one case already described elsewhere (Cruickshank and Cruickshank, 1951) a cyst within the diaphragm itself was clearly shown by this method. In another instance, an omental hernia through the foramen of Morgagni was clearly demonstrated.

The method of induction has been that in common use, but it has been necessary on occasion to inject as much as 2,500-3,000 ml. of air in order to get satisfactory radiographs. As soon as these have been obtained the majority of the air should be withdrawn forthwith. We have on occasion carried out this procedure in out-patients, although admission to hospital is much to be preferred.

Angiocardiography has been carried out in only five cases in the present series. Undoubtedly its greatest value is in the differentiation of shadows of vascular origin from those of non-vascular origin. Displacement of the great vessels by tumour masses may also be shown by this method.

Exploratory thoracotomy: This was necessary on purely diagnostic grounds in thirty-eight cases. Excluded from this number are five cases of diaphragmatic hernia in which the correct diagnosis was made before operation was carried out.

Illustrative Case Histories

The following case histories are selected to show the variety of complications which have been encountered in lesions which clinically and radiologically appeared quite inactive.

Case 1

J. H., male, aged 44. This patient was a worker at the coal face, and was X-rayed when the Mass Radiography Unit visited the mine in which he was employed. He was completely symptom-free. A well-defined round shadow the size of a shilling was seen in the left lower lobe and exploration advised. At thoracotomy a stony hard mass was found and lobectomy carried out. Histologically the lesion was an early squamous-cell carcinoma, with no lymph-node involvement. The patient returned to work at the coal face four weeks after lobectomy.

Case 2

J. F. N., aged 31. This man was found to have a tumour of the upper posterior mediastinum with some "splaying" of the posterior ends of the fifth and sixth ribs (Figs. 1 and 2). On close questioning he admitted to some pain in the right chest. At thoracotomy an apparently benign neurogenic tumour was removed. Histologically the tumour was a ganglio-neuroma with central malignant changes.

Case 3

M. M., female, aged 45. This woman was X-rayed as a routine whilst undergoing psychiatric treatment. A rounded calcified opacity was seen in the left posterior cardio-phrenic angle (Figs. 3 and 4). A provisional diagnosis of extralobar sequestration was made. This was confirmed at operation, when an abnormal artery passing through the diaphragm and entering the

mass required ligature. During removal the mass ruptured and caseous material escaped. Diagnosis: extralobar sequestration with gross tuberculosis superadded. Her post-operative course was uneventful and she has remained well for over nine months.

CASE 4

J. G. E., male, aged 47. Completely symptomless. Mass X-ray revealed a large spherical mass in the right lower lobe (Figs. 5, 6 and 7). At thoracotomy extensive old-standing adhesions were found over the lower lobe and an elastic-feeling tumour was present. There were several enlarged mediastinal glands. Right middle and lower lobectomy was performed. Histologically this proved to be a bronchial adenoma with central degeneration and early malignant changes in the lymph nodes. Post-operative course was uneventful.

Results and Discussion

The final diagnosis in fifty-two patients investigated fully is shown in Table I. The diagnosis was confirmed by operation in forty-three cases. There were no deaths and no serious complications. Several matters require comment. The most important and significant finding in this series is that eight cases (15%) were found to be suffering from malignant disease and yet were completely free of symptoms. By their acceptance of exploratory thoracotomy they received the benefit of surgical treatment at an early and favourable stage. All these cases did well. This relatively high incidence of unsuspected malignancy in patients found to have a symptomless circumscribed intrathoracic opacity is in itself sufficient to justify exploratory thoracotomy.

The liability of certain benign intrathoracic lesions to infective complications is well recognised. When such a complication occurs the symptomatology and clinical picture may become very complex, and indeed the initial lesion may remain unsuspected. In any event, the difficulties and dangers of surgical intervention are increased very considerably by such a complication, and it appears much more logical to employ surgery as a prophylactic measure in the symptomless stage when the opportunity presents.

The only case in this series in which infection was present has already been described (Case 3). Naturally infective complications commonly give rise to symptoms, and therefore such cases are outside the scope of the present paper.

A tendency to increase in size is characteristic of the majority of intrathoracic "tumours," using the word in the widest sense; the hazards of removing large space-occupying lesions from the chest are well known. It is again logical, therefore, to remove such lesions at a stage when operation is simple and straightforward, rather than await the inevitable increase in size and eventual pressure effects which make operation mandatory under frequently very unfavourable conditions.

A word should be said about the five patients who were found to have pulmonary tuberculosis. In these cases it was not possible to make a diagnosis with any degree of confidence without exploration. All had lesions of the "tuberculoma" type, and all had resections carried out, with satisfactory results. It is the belief of the Leicester group that such lesions should in any

event be resected—we feel that even if a more conservative attitude were justifiable it would have no place where a diagnosis of malignant disease was a possibility.

The five cases of diaphragmatic hernia are of some interest—in all the correct diagnosis was made before operation by either a barium series or a diagnostic pneumoperitoneum, but as they caused considerable diagnostic difficulty in the hospitals in which they were first observed, it was thought justifiable to include them in this series. The radiological diagnoses in the two foramen of Morgagni lesions (both of which contained almost entirely omentum) were " hydatid cyst " and " silicotic nodule."

The traumatic hernia apparently resulted from pressure necrosis, as it lay just beneath the site at which an empyema had been drained over fifty years previously. It contained omentum only, and radiologically had been called " pleural thickening."

The hiatus hernia was very unusual in that it contained almost the entire transverse colon and omentum, with only a very small portion of stomach. This was considered to be " collapsed right lower lobe " in its hospital of origin.

The hernia through the foramen of Bochdalek occurred in a child of six years, it was left-sided, and had a peritoneal sac containing only spleen.

TABLE I.—DIAGNOSIS IN FIFTY-TWO INVESTIGATED CASES

Primary bronchogenic carcinoma	6
Pulmonary tuberculosis (" tuberculoma ")	5
Neurogenic tumours—benign	5
Neurogenic tumours—malignant	1
Diaphragmatic hernia (excluding liver hernia)	5
2 foramen of Morgagni (omental)	
1 foramen of Bochdalek (spleen in sac)	
1 œsophageal hiatus (almost entirely omental)	
1 traumatic (omental)	
Liver hernia and other abnormalities of the right diaphragm	8
Mesothelial cysts (various sites)	5
Mediastinal " tuberculoma "	3
Substernal goitre	2
Mediastinal lipoma	2
Bronchial " adenoma "—benign	1
Bronchial " adenoma "—malignant	1
Solitary silicotic nodule	2
Mediastinal dermoid cyst	1
Extralobar sequestration with tuberculous infection	1
Bronchogenic lung cyst	1
Calcified hæmatoma	1
Hydatid cyst	1
Vascular abnormality (dilated pulmonary artery)	1

Summary and Conclusions

1. A series of fifty-six symptomless circumscribed intrathoracic opacities is presented and analysed.

2. The difficulty of accurate diagnosis is stressed and the available diagnostic methods are described briefly.

3. Exploratory thoracotomy is advocated when accurate diagnosis is impossible. It was carried out in forty-three cases without mortality.

4. The relatively high incidence of unsuspected malignant disease (15%) is stressed.

5. Infective complications or progressive increase in size occur in many benign intrathoracic " tumours "—operation in the symptomless stage avoids the increased risk which these complications add.

My thanks are due to the many colleagues who referred cases to me, and in particular to Dr. M. E. Moore, formerly Medical Director of the Leicester Mass Radiography Unit, who provided much of the material and whose close co-operation was of the greatest assistance. My thanks are also due to Dr. D. B. Cruickshank for the pathological reports and photographs.

REFERENCE

CRUICKSHANK, G., and CRUICKSHANK, D. B. (1951): *Thorax*, **6**, 145.

NATURAL RESISTANCE TO MULTIPLE TUBERCULOUS LESIONS

REPORT OF A CASE

By Grace A. O'Malley
From Colindale Hospital, London

The number of cases on record of a patient with a widespread variety of active tuberculous lesions, where the treatment consists essentially of masterly inactivity, is limited. Alexander and Mansuy (1950) described a patient with disseminated bone tuberculosis of more extensive distribution than had been reported previously. There were areas of destruction in the skull, the cervical, dorsal and lumbar spine, the left ilium, the left scapula and multiple ribs. Progressive recovery was reported using dihydrostreptomycin therapy. There have been various reports (Vidal and Vedel, 1941; and Burnand, 1939) of multiple tuberculous lesions which were demonstrated at autopsy.

Because of the paucity of reported cases and of the generally accepted idea that multiple tuberculous lesions carry an extremely poor prognosis, the following case, which has come under our care, seems worthy of placing on record.

Case Report

F. E., aged 30, an ex-able seaman, with no known tuberculous family history and no significant past history, first complained in May 1942 of stabbing pain in the right chest and breathlessness. He was admitted to a hospital ship, where pleural effusion was diagnosed. This necessitated his transfer to a shore hospital, where aspirations were carried out, yielding 1½ to 5 pints of straw-coloured fluid. After six months he was transferred to a civilian hospital, where aspirations were continued and the fluid showed a good growth of tubercle bacilli. It was reported at this time that there was free fluid in the abdomen and that the liver was enlarged and tender.

In December 1942 he was transferred to a sanatorium. Shortly after admission, left otitis media developed, discharging thick pus which subsequently grew acid-fast bacilli. The discharge continued intermittently until it finally dried up nineteen months later. Chest aspirations were continued and the fluid slowly became cloudy.

In April 1943 a fluctuant swelling was noticed below the left internal malleolus, followed a few weeks later by a swelling over the left sacro-iliac joint, while a third swelling appeared below the right costal margin. At this stage he was immobilised in a plaster bed and continued in it for fourteen months. The swellings were aspirated and tubercle bacilli were grown from the contained pus. Later, sinuses developed and corresponding bony changes were seen radiologically. The sinuses closed and bony lesions healed during the course of the next eighteen months.

In September 1943 the left thumb became swollen and tender to pressure and manipulation at the metacarpo-phalangeal joint. Pus was obtained on exploration and this contained Koch's bacilli. A few months later a sinus

developed. This was treated effectively by U.V.L. and the thumb was immobilised in plaster. Healing was complete after nearly two years.

In October 1943 a fusiform fluctuant swelling appeared over the upper third of the right fibula, which yielded tuberculous pus on aspiration. A sinus formed and persisted for fourteen months. An area of periostitis was seen radiologically along the external surface of the upper third of the fibula.

In December 1943 a peri-anal abcess appeared. A few weeks later a sudden rectal hæmorrhage occurred and within a few hours 1½ pints of blood were lost. The patient became extremely shocked and appeared moribund, but his condition improved after blood transfusion. There were intermittent small hæmorrhages in the succeeding months until the track was excised a year later. The wound finally healed eighteen months after operation.

In March 1944 a sudden hæmaturia occurred followed by right renal colic. Although hæmorrhage persisted for two to three weeks and an intravenous pyelogram suggested disease of the lower pole of the right kidney, intensive search failed to demonstrate tubercle bacilli in the urine. Shortly after a cervical adenitis appeared, but this subsided in a few months without suppurating.

In August 1944 he was admitted to Colindale Hospital. An X-ray of the chest showed a large effusion on the right side. His general condition was fairly good. He weighed 9 stone 13 lb. E.S.R. was 41 mm. (the highest so far reported) and he was afebrile. There was no evidence of an enlarged liver or free fluid in the abdomen. The sinuses of left thumb, left ankle, right fibula and left sacro-iliac joint were discharging, as was the peri-anal abscess. The empyema was still present, aspirations were carried out at regular intervals and the pleural space was washed out with Azochloramide 13300.

In April 1945 the left testis began to swell and became painful. Examination revealed hardening of the lower pole of the epididymis. An abscess with discharging sinus developed two months later, but this cleared up in three months with routine treatment.

In October 1946 he was discharged from Colindale hospital, but attended regularly for aspirations of his empyema; in June 1948 PAS was given intrapleurally until the lung became fully expanded in December 1948, and there has been no trace of fluid since. He has been capable of working for the past few years, but in fact has found it more profitable to do leather work at home.

Now his general condition is excellent, he is symptom-free, weighs 11 stone 10 lb. and has an E.S.R. of 4 mm. His ear is clean and dry and all his sinuses have healed. Radiologically, apart from residual periostitis of the fibula and thumb, all previously affected bones and joints appear healthy. The chest film reveals no active intrapulmonary foci, there is some thickening of the pleura on the right side, with no evidence of a persistent empyema, the underlying lung being entirely re-expanded.

For the purpose of this paper he was thoroughly re-investigated in October 1951. On routine examination the urine revealed numerous W.B.C.s and a few R.B.C.s and from a 24-hr. specimen tubercle bacilli were grown. He has been seen by a urological surgeon, whose opinion is that he has had genito-urinary tuberculosis, in view of the hæmaturia and right epididymitis. He reports his present condition as follows: " There are no urinary symptoms and rectal examination is negative; he has a hard craggy epididymis which is tuberculous, the vas is also thickened—this he thinks should be removed. An intravenous pyelogram showed no significant change."

Discussion

Apart from immobilisation, rest, aspiration of pus with Azochloramide washouts, and PAS intrapleural instillation, no other treatment was given. The patient can truly be said to have acquired, during the course of his protracted illness, an extraordinary degree of resistance to infection. It is interesting to note that he—an intelligent man—dates the turning-point of his disease to the rectal crises and states that, as he recovered from the hæmorrhages, so he felt himself to be recovering from his general tuberculous decline. It is certainly true that, from a clinical standpoint, throughout 1943 the disease was steadily advancing and his condition was progressively deteriorating. From early in 1944 he has made an almost uninterrupted recovery. To look at him now it is hard to credit his years of invalidism.

The recent urinary findings represent, we consider, less of a retrogression in the overall tuberculous picture than a purely local residual manifestation.

Summary

A case has been presented of a man who has suffered from a large variety of active tuberculous lesions over a period of six years. Largely due to his own powers of resistance, all but one of the lesions appear to have healed completely. He has been followed up as an out-patient for a period of five years.

I am indebted to Mr. J. H. Carver for his recent opinion on the present urological condition.

REFERENCES

ALEXANDER, G. H. and MANSUY, M. M.: *Radiology*, 1950, **55**, 839.
BURNAND, R. (1939): *Rev. Med. de. la Suisse Rom.*, **59**, 769.
VIDAL, J., and VEDEL, A. (1941): *Montpellier Med.*, **19, 20**, 177.

REVIEWS OF BOOKS

Treatment of Asthma. Edited by HAROLD A. ABRAMSON, M.D. London: Baillière, Tindall & Cox, Ltd. Pp. xiv+752. Illustrated. Price 84s.

This is a comprehensive, up-to-date study of the treatment of asthma in 751 pages. It is divided into six parts; Part 1 on "basic concepts," which includes the physiology of respiration, experimental production of asthma and animal allergy; Part 2 on general testing and treatment; Part 3 on inhalant allergens and their therapy; Part 4 on "somatic therapy"; Part 5 on psychotherapy; and a short Part 6 on therapy of asthma in Cuba and other countries of Latin America. The editor, Harold A. Abramson, is Associate Physician and chief of the Allergy Clinic, the Mount Sinai Hospital, New York, and Assistant Professor of Physiology at the College of Physicians and Surgeons, Columbia University. He is to be congratulated on producing a readable and comprehensive work and one deserving of close study.

There is a section (chapter 23) on cortisone and adrenocorticotropic hormone therapy, where short intensive courses of either drug are advocated, 25 mgm. ACTH six-hourly until a total of 125-325 mgm. has been given, or cortisone 300-400 mgm. daily for two to three days, reducing to smaller dosage for a further four to seven days. Status asthmaticus in childhood is discussed (p. 353), with full emphasis on the difficulties of differential diagnosis. The author of this section, Dr. Bret Ratner, makes many good points regarding therapy. He favours repeated small subcutaneous 2-4 minim doses of epinephrine in 1/1,000 dilution and warns against larger dosage. He writes: "I am convinced that large doses of epinephrine are harmful, for they add insult to injury. After the patient has received large doses, not only must the physician combat the asthma, which is bad enough, but he suddenly finds his patient with rapid bounding pulse, heightened blood pressure, tremor, extreme pallor, syncope and almost complete loss of ability to battle for life." He warns strongly against the use of morphine, which can be fatal in such attacks, atropine, Demerol and the antihistamine drugs. He ends the section on status asthmaticus with this statement: "Huber once remarked that most patients with status asthmaticus die not because of their condition but because of what has been done to them. I am in accord with this point of view, particularly as regards young children." In a chapter on intravenous therapy of status asthmaticus Dr. Ethan Allen Brown draws attention to the fluid needs of the patient in this condition and the dehydration that is so frequently present. He finds aminophylline intravenously helpful if subcutaneous epinephrine fails, and intravenous alcohol even more helpful in 5% strength in glucose saline drip. The same author cautions against full dosage of intravenous aminophylline where ephedrine has previously been given, stating that in such cases its toxicity is doubled.

In the full choir of transatlantic voices of American authors there is only one small, still voice from the Old World, that of Professor C. Rimington, who writes a chapter on "The chemical nature of dust" (chapter 13). He is to be congratulated on an interesting and stimulating chapter in an interesting and stimulating publication. Full value is given to the importance of psychological factors in asthma, a whole chapter being devoted to "maternal rejection." All in all this is a book worthy of study and the editor is to be congratulated on its compilation.

F. D. HART.

Pathological Histology. By ROBERTSON F. OGILVIE, M.D., D.Sc., F.R.C.P.(ED.), F.R.S.E. Fourth Edition. Edinburgh: E. and S. Livingstone Ltd. Pp. 494 with 295 photomicrographs in colour. Price 40s.

This textbook was designed to act as a companion to standard textbooks in pathology, and the present edition is a worthy successor to the original. The most notable feature of the work is the employment of colour photography in photomicrographs illustrating the various morbid processes. This edition, while not entirely comprehensive, nevertheless covers a wide range of subjects, and new material has been added to the sections on the respiratory system, and also on those sections dealing with the alimentary, urinary, reproductive, hæmopoietic, nervous and integumentary systems.

While primarily a handbook to guide the student of morbid histology, it will be found a most useful reference book for clinicians desiring to refresh their memories on histological details of various morbid processes.

The section on the respiratory system comprises a lucid account of bronchiectasis, the pneumonias, tuberculous infection, emphysema and the various pneumokonioses. The illustrations are well chosen and of admirable clarity.

Bronchial carcinoma is dealt with in the section on tumours, and includes a description of the macroscopic appearance and of the various histological types. A single photomicrograph serves to illustrate the oat-celled type and the ontological relationships are clearly indicated.

Illustrations in all sections throughout the book are carefully selected and representative, and there are many improvements in the photomicrographs as compared with earlier editions.

From the point of view of clarity there is much to be said in favour of coloured illustrations, both for those who use the book as a " reminder " and also for students who have access to a microscope and histological preparations. The interpretation of what is seen is rendered infinitely easier than is the case with photomicrographs in monochrome.

The author, technical photographer and publishers alike are to be congratulated on the excellence of this production.

L. WOODHOUSE PRICE.

Food and Nutrition. By E. W. H. CRUICKSHAW, M.D., D.Sc., Ph.D., M.R.C.P., Regius Professor of Physiology in the University of Aberdeen. Second Edition. Edinburgh: E. and S. Livingstone Ltd. Pp. 443, 51 figs. Price 30s.

Professor Cruickshaw's book will make a wide appeal to the scientifically minded in search of authoritative information, and to the lay reader who can combine instruction with recreation.

The introductory chapter dealing with the evolution of human dietaries is of more than historical or biological interest. The influence of climate and of religion upon dietary habits is correlated with change of taste and fashion, especially in regard to possibilities provided by ever-increasing celerity and convenience of transport. (The reviewer recently had the experience of eating a pineapple cut from a plantation in West Africa on the preceding day.)

But the chief motive of the work is undoubtedly the appreciation that it required a world war to show us how to grapple with the problem of national nutrition.

It is a commonplace that the official pronouncements that the nation has never been better fed are, in certain circles, greeted with unqualified

incredulity. But it is difficult for what may be termed the privileged class, to whom in pre-war days financial stringency had no influence on their dietary, to realise how tiny a minority they comprise. They cannot see the situation on a broad national scale and accept the advantage that with uniform distribution all classes, irrespective of income, have the opportunity to secure an appropriately adequate diet. And with the greatest admiration for adjustment by those officially responsible, and the acceptance of their assurance, it is clear that all is not right with the world in general and the British Isles in particular.

Professor Cruickshaw tells us that previous to the war the egg consumption in the United Kingdom was 3·4 eggs per person per week, of which number 1·8 were home produced. He emphasises that the consumption rate of 1 egg per day per head of population should be accepted as our standard. Regarding meat, he gives as the minimal allowance in terms of edible weight not less than 14, 7 and 9 ounces of beef, mutton and pig meat respectively, to supply 16 gm. of animal protein per head per week.

Surely the actual provision in these respects is far from being achieved.

The outstanding lack in the diet to-day is fat, in connection with which the invisible part is particularly deficient, the addition which is so essential for the appearance, the smell and the flavour of the cooked material and the absence of which is responsible for the deadly monotony which, with lack of freedom of choice, is the subject of so much bitterness and complaint, however perfectly the required standard for calories and nutrients is met.

Milk is the nutrient which calls for the greatest emphasis. The author indicates the high biological value of its protein, its rich store of mineral salts, especially of calcium and phosphorus, its substantial content of vitamins A and B of B6, riboflavin, and nicotinic acid. The lack of vitamins C and D must not be forgotten, but these can be provided by administering orange juice and cod-liver oil.

As was to be expected, the danger of ingesting raw milk is statistically represented. In England and Wales, in 1944, 1,350 deaths occurred from non-pulmonary tuberculosis of bovine origin. And although pulmonary tuberculosis is chiefly of human type, in 1937 out of 2,007 " bovine deaths " 487 pulmonary cases were recorded.

The style is attractive and care has obviously been taken in the avoidance of errors. One notes the very common misspelling of *desiccation; averse* has been employed for *adverse;* and, rather amusingly, on one occasion the context does not decide whether *over-heating* is a playful printer's variant when *over-eating* was the writer's intention.

ADOLPHE ABRAHAMS.

Thoracoplasty in the Treatment of Cavernous Tuberculosis of the Lung. By ERLING REFSUM. *Acta Tuberculosa Scandinavica* (Supplement XXIX. 29). Copenhagen: Ejnar Munksgaard. 1951. Pp. 315, 5 plates.

This monograph is a clinical statistical study of the late results of thoracoplasty, based on material from the Oslo University Clinic and Glittre Sanatorium, Oslo. It seeks first to provide a comparative basis of control cases, treated conservatively, but with lesions which would now indicate the need for thoracoplasty. They consist of 106 patients treated between 1921 and 1928.

The thoracoplasty cases consist of 391 patients operated on between 1930 and 1939 by Professor Holst and his colleagues, including Dr. Semb, and they have been carefully analysed. The results of thoracoplasty in relation to all

factors are detailed. The conversion of sputum, return to work, and absences of relapse are given.

The literature of thoracoplasty and its results is extensively reviewed, and a good bibliography is added. Numerous detailed and helpful case reports are given.

Although the notorious difficulty of finding comparable control cases and comparing operation results in pulmonary tuberculosis has been accepted, an honest and statistical review has been made, and we are glad to have this full report from the well-known workers in Oslo, who have done so much good work in the management of tuberculosis, and especially in the development of the operation of thoracoplasty.

Among the results enumerated are a post-operative mortality of 6·9 per cent. for the once-operated patients, with a higher mortality for women than men. Operations on the left side seem more dangerous than on the right, though a good result is more often obtained on the left side. 62 per cent. of patients became symptom free on strict standards, which include disappearance of tubercle bacilli and closure of cavities. 76 per cent. of patients were able to work, 50 per cent. fully and without relapse. The follow-up period has been from 6 to 15 years. All the patients have been traced: of those surviving the operation, 85 per cent. were alive after five years, and 67 per cent. after ten years. The factors influencing the results—sex and age, side of the lesion, extent and type of the disease, condition of the other lung, duration of the disease and extent of the operation—are all fully considered.

The conservatively treated and more favourable type of case had a mortality two and a half times as great as those subjected to thoracoplasty.

This work is in English and is very readable. Our only criticism is of the use of the word " abacillary " to describe the sputum when free from tubercle bacilli; and the " debacillation " of patients with pulmonary tuberculosis sounds rather horrifying, though we know no better brief wording with the same meaning.

We commend to all tuberculosis workers this clear and honest account of the results of thoracoplasty. Coming from the well-known workers in Oslo who have done so much pioneer work, it provides a useful yardstick of the results of operations between 1930 and 1939, reviewed after an adequate period of observation.

A. Brian Taylor.

Traité de Medicine. Publié sous la direction de MM. Pr. A. Lemierre, Pr. Ch. Lenormant, Ph. Pagniez, Pr. P. Savy, Pr. N. Fiessinger, Pr. L. De Gennes, A. Ravina. Secrétaires Generaux: A. Ravina et J. Patel. Vol.: III. Paris: Masson et Cie. Price 3,600 fr.

This is the third volume of a comprehensive treatise on medicine written by a large series of experts in their particular subjects, and edited by a board of distinguished physicians and pathologists.

The book consists of no less than 910 pages and it tells mainly of the pathology of tuberculosis, cancer and syphilis.

The French have always played a leading part in the advancement of our knowledge of tuberculosis, and the 269 pages devoted to the pathology of this infection serve as a reminder of how much we owe to their research work. Perhaps the influence of France is a little over-stressed, and too little credit is given to workers in other countries. Nevertheless an impressive amount of original research has been carried out in France and the presentation in this

book is full and comprehensive. The sections on streptomycin and on B.C.G. vaccination are particularly complete and up-to-date.

We still do not know the cause of cancer. A great deal of work has been done during the years of the present century and it is admirably summarised here. There is an excellent account of our knowledge of carcinogenic substances and the author adopts the view, which is disturbing the public mind very greatly at present, that tobacco smoking is an important factor in the production of cancer, not only in the bronchi, but also in other organs, notably the lips, tongue and larynx.

The next section, and one of the most interesting in the book, is devoted to the Besnier-Boeck-Schaumann disease. The description of the macroscopic and microscopic lesions to be found in almost every part of the body is very clear, and it succeeds in conveying an accurate impression of the plemorphic manifestations of this baffling disease. The writer of this section at one time considered it to be due to a variety of tuberculosis, but he now leans to the theory of virus infection, although he accepts the fact that there is some affinity between tuberculosis and sarcoidosis.

The final section deals with syphilis, and no less than 392 pages are devoted to a complete account of the etiology and pathology of this infection.

The presentation of the material is excellent throughout and the illustrations are of an adequate standard. The book suffers to some extent from the absence of a proper index, so that its value as a work of reference is somewhat impaired.

JAMES MAXWELL.

Chest Surgery for Nurses. By J. LEIGH COLLIS, B.Sc., M.D., F.R.C.S., and L. E. MABBITT, S.R.N. 3rd Edition. London: Baillière, Tindall and Cox. Pp. 184, Illus. 12s. 6d.

The third edition of this readable little book, last revised in 1946, has been made necessary by surgical advances in the past lustrum: sections are now added on Blalock's operation, valvulotomy and aortic anastomosis, as well as upon the surgery of the œsophagus. In addition the whole section on pulmonary tuberculosis has been revised in the light of chemotherapeutic progress. While fulfilling admirably its object in instructing nurses in the practice of chest surgery, particularly in the earlier chapters on anatomy and physiology, general clinical principles, breathing exercises and anæsthesia, the book goes a good deal farther and might profitably be read by medical students.

It is a pity, perhaps, to find strapping—even strapping right round the chest—still advocated for rib fractures and its retention for three weeks advised; and the importance of bayonet or screw fittings on all aspirating needles ought to be stressed. Mention of " persistent " thymus, and the inclusion of a lung tourniquet among lobectomy instruments, are relics perhaps of earlier editions.

This book has no competitors and should be compulsory reading for all nurses concerned with thoracic surgery. It is profusely and clearly illustrated by line drawings and diagrams, and there is a separate section of well-reproduced X-rays.

GEOFFREY FLAVELL.

BOOKS RECEIVED

The following books have been received and reviews of some of them will appear in subsequent issues.

The Quiet Art—A Doctor's Anthology. By Dr. Robert Coope. E. and S. Livingstone, Ltd. 1952. Pp. 284. Price 12s. 6d.

The Diagnosis and Treatment of Intrathoracic New Growths. By Maurice Davidson, David Smithers and Oswald S. Tubbs. Oxford Medical Publications. Pp. 260. Price 42s.

Essentials in Diseases of the Chest. By Philip Ellman. Oxford University Press. Pp. 410, 298 illustrations. Price 30s.

Management of Bronchial Asthma. By H. G. J. Herxheimer. Butterworth and Co. Pp. 107. Price 22s. 6d.

Modern Practice in Tuberculosis (2 volumes). By T. Holmes Sellors and J. L. Livingstone. Butterworth and Co. Volume I, pp. 457, 105 illustrations. Volume II, pp. 523, 161 illustrations. Price 7 gns.

Health Horizon, Winter 1952. Editor: Harley Williams, O.B.E., M.D. Pp. 55. Price 2s. 6d.

Tuberculosis Index. December 1952. Volume VI, No. 4. (National Association for the Prevention of Tuberculosis.)

Publicaciones del Centro De Investigaciones Tisiologicas. Volume XV. Editor: Professor Roque A. Izzo. Pp. 257.

Untoward Reactions of Cortisone and ACTH. By Vincent J. Derbes and Thomas E. Weiss. Blackwell Scientific Publications. Pp. 51. Price 8s. 6d.

Causes and Prevention of Tuberculosis. By Brice R. Clarke. Foreword by Professor J. H. Biggart. E. and S. Livingstone, Ltd. Pp. 288. Price 32s. 6d.

The Pathogenesis of Tuberculosis. By A. R. Rich. Blackwell. Pp. 1028. Price 107s. 6d.

REPORTS

JOINT TUBERCULOSIS COUNCIL

THE Honorary Secretary has reported on the quarterly meetings held during 1950. An increase in the Ministry of Health's grant from £100 to £300 was welcomed and the completion of the Forms of Record for the chest services was regarded as an important achievement.

The system of medical examination of immigrants was further studied during the year, together with the question of the repatriation of tuberculous foreign seamen.

A Joint Committee on Radiology had produced for the Ministry of Health a revised report of skiagraphic terminology and a report on radiographic technique.

Three pilot units have been installed to consider the possibilities of a photofluorographic X-ray camera taking 5 in. by 4 in. films.

The Council report their opinion on the trial of a Four Digit Classification of Tuberculosis and had sent to the Ministry of Health a memorandum on the internal administration of hospitals.

The Ministry of Health had acknowledged the Council's help in the preparation of a memorandum on the protection of organised groups of children from tuberculous infection.

Among its other activities the Council had considered a memorandum on the rehabilitation of doctors, taken part in the work of the Tuberculosis Education Society, and sent representatives to the British Co-ordinating Committee on Student Health, British Council for Rehabilitation and other bodies. Finally, it acknowledges help given by observers from various Government Ministries.

Report of the Medical Officer of Health, County Council of the West Riding of Yorkshire, 1950.

THE County Medical Officer of Health of the West Riding Division of Yorkshire Dr. Fraser Brockington, who has now retired to take the chair of social medicine in Manchester, in his Annual Report for 1950 makes a number of stimulating observations. We quote a few extracts from his report which are of particular interest to our readers.

" The family is the biological unit upon which the health of the community most depends. In this light it is difficult to examine our present health service without some misgiving. We have accumulated much wisdom and yet are in danger of forgetting a simple truth. If we need to treat the family as a living and growing organism it must logically have a doctor; and the family physician armed with every reasonable aid should be paramount in the health scene. The most optimistic observer could hardly consider this now to be true; the family doctor of yesterday is the general practitioner of today, and whereas he was first in our forefathers' minds he now ranks as second or third; much of his authority has passed to the hospital and his families are dissolving into individuals.

" The Medical Officer of Health (and Divisional Medical Officer) is increasingly the ' Tuberculosis Officer ' of his area now that the former tuberculosis officers have retreated within hospital as ' Chest Physicians.' This

means that the medical officer of health must increasingly study the epidemiology of tuberculosis in his area and treat every case as a subject of special investigation. It is lamentable that another year should have passed without finding a solution of the difficulty which prevents joint use of chest physicians by Regional Hospital Boards and Local Health Authorities. With goodwill the services are being maintained, but the situation markedly impairs the development of our scheme for the prevention, care and after-care of tuberculosis. Within the limits of the time made available such arrangements should provide for the chest physicians to undertake such duties as the County Council may consider desirable in the furtherance of their scheme. We already meet with one major obstacle in the X-ray examination of staff (nurses, midwives, teachers, etc.), whose association with groups of the population at abnormal risk makes it essential to eliminate any possible danger of them being a source of infection. This serves again to emphasise that the chest physician must be available to tackle any job which may serve to prevent tuberculosis spreading. With the exercise of patience and understanding on both sides we must hope for a final answer to this difficult problem.

" Effective measures for the care and after-care of the tuberculous patient depend largely on intimate co-operation between the chest clinic and the health department. One major impediment lies in our inability to arrive at any satisfactory agreement for the joint services of the chest physicians. In this situation it is of the utmost importance that a link should be forged through the public health nurse who attends the chest clinic and is the channel of information from that centre to the health department. Formerly it was the practice of the County Council to favour the employment of whole-time tuberculosis visitors, wherever practicable, combining clinical duties with domiciliary visiting. The considerations determining such a choice have become largely invalid with the departure of the tuberculosis officers from the county service, combined with the tendency of the Hospital Management Committees to appoint *ad hoc* clinic nurses."

The broad outlines of an industrial health service in relation to the case of the industrial worker are outlined by Dr. Brockington.

A further noteworthy feature in this report is an investigation into the evolution of chronic bronchitis.

" The year saw the beginning of a long-term study designed to learn," reports Dr. Brockington, " more about the evolution of chronic chest diseases with subsequent heart failure. This condition, known as ' *cor pulmonale*,' certainly appears to be prevalent in South Yorkshire, and although we know singularly little about its epidemiology it may in fact occur more frequently here than in other parts of the country. Professor C. H. Stuart-Harris of Sheffield University proposed that his department and the West Riding health department should combine in fundamental research into its cause, and incidentally add to our knowledge of bronchitis and emphysema with which it is closely associated. Professor Stuart-Harris discussed his project with Dr. Fraser Brockington and the nine Divisional Medical Officers in the part of the county covered by the Sheffield Regional Hospital Board, and it was ultimately decided to pursue the study among workers in Newton Chambers steelworks on the borders of Sheffield. With the goodwill of the management and the workers it has been possible to obtain sufficient volunteers from this one industry to enable the study to proceed. The general practitioners in the area from which the workers are drawn have agreed to collaborate with Professor Stuart-Harris and Dr. Russell. The county council have agreed to bear the cost of two whole-time

health visitors for five years, whose duty it will be to make regular visits to study the background of the family, the environment, the infections and all other matters concerning the workers whose progress is being studied. The venture will be watched with interest by all those who are concerned with health in industry."

Report of the Medical Officer of Health, Derbyshire County Council, 1950.

In the Annual Report of the County Medical Officer of Health, Dr. J. B. S. Morgan, for the year 1950, makes the following observation in regard to tuberculosis:

"There has been a decrease in the number of new cases of pulmonary tuberculosis notified from 491 to 426, and of non-pulmonary tuberculosis from 101 to 88 as compared with the previous year; whereas the corresponding number of deaths from pulmonary as well as non-pulmonary tuberculosis diminished from 205 to 172, which constitutes a new low record. The figure of 172 gives a death rate of 0·25 per 1,000 of the population, which compares favourably with 0·36 per 1,000 which is the provisional figure supplied by the Registrar-General for England and Wales."

Report of the Medical Officer of Health, City of Glasgow, 1950.

The Medical Officer of Health for the City of Glasgow, Dr. Stuart Laidlaw, reports that in the field of tuberculosis 1950 was notable for two outstanding features. One was the definite decrease in the recorded incidence of the disease and the other was the introduction of B.C.G. vaccination.

The total of 2,446 cases of pulmonary tuberculosis notified during 1950 is 383 fewer than in 1949, and the lowest total since 1942. The cases of non-pulmonary tuberculosis numbered 369, almost half the total of 735 which was recorded as recently as 1943. Although this decrease is satisfactory, the total for 1950 still remains 48% above the pre-war average. There is some evidence that cases registered are being discovered at an earlier stage than hitherto, but frequently this initial advantage is lost through the long delay in obtaining hospital treatment. The housing conditions of the city are such that in a large number of cases successful home treatment cannot be carried out, and isolation of the patient is impossible. Concentration on the treatment of the patient alone is insufficient. The work of the tuberculosis health visitor is absolutely essential in the teaching of proper hygiene, so as to minimise risk to other members of the family.

NOTES AND NOTICES

HONOURS

Our congratulations to Sir Geoffrey Marshall and Sir Clement Price Thomas were recorded in our last issue. We wish also to congratulate Professor Charles Cameron, C.B.E., a distinguished member of our Editorial Board, and Dr. Peter Kerley, C.V.O., on the honours recently conferred upon them.

Professor John Crofton, M.D., F.R.C.P.

Dr. John Crofton, who is well known to all our readers, has recently succeeded Professor Charles Cameron as Professor of Tuberculosis and Diseases of the Chest at Edinburgh University, and we congratulate him most heartily on this distinction. He will, we feel sure, prove a worthy successor to Sir Robert Philip and Professor Cameron.

WELSH NATIONAL SCHOOL OF MEDICINE, DEPARTMENT OF TUBERCULOSIS

Short Course on Tuberculosis and Diseases of the Chest

Professor Frederick Heaf sends us general information of this course, which commences on the first Tuesday in October and lasts for approximately nine weeks, and has been established to provide tuition for post-graduate students who wish to acquire an intimate knowledge of the problems of tuberculosis and associated conditions, but have only a limited time to devote to the study of the subject.

The first seven weeks of the course are given at the Department of Tuberculosis, the Welsh National School of Medicine, Cardiff, and include lectures and demonstrations on the administrative and clinical problems associated with tuberculosis and chronic diseases of the chest in adults and children.

The syllabus covers the prevention, epidemiology, diagnosis, pathology and treatment of these diseases, and opportunity is given to each student to act as a clinical assistant at a tuberculosis institution of the Welsh Regional Hospital Board. Attention is also devoted to the industrial aspect of diseases of the chest, and the class studies pneumoconiosis at the Medical Research Council's Pneumoconiosis Research Unit at Llandough Hospital. Visits to neighbouring coal mines and other industrial concerns are arranged so that industrial conditions can be appreciated.

The lectures and demonstrations are given by physicians and surgeons who are specially interested in particular aspects of tuberculosis and diseases of the chest, there being over thirty persons who assist in the tuition of the students taking the course.

The last two weeks of the course are spent at the Pasteur Institute, Paris, where instruction and practical demonstrations are given on the preparation and adminstration of B.C.G. vaccine.

The fees cover the tuition at Cardiff and Paris, and assistance is given by the secretariate of the Tuberculosis Department in Cardiff, and by the authorities at the Pasteur Institute, in finding accommodation for students in Cardiff and Paris respectively for the period of the course.

TUBERCULOSIS EDUCATIONAL INSTITUTE

INTENSIVE three-day clinical courses will be held at the following centres during 1952:

Cheshire Joint Sanatorium, Market Drayton, Shropshire—May 14, 15 and 16; November 12, 13 and 14.
King George V Hospital for Diseases of the Chest, Godalming, Surrey—June 4, 5 and 6; October 1, 2 and 3.
Red Cross Sanatoria of Scotland (Tor-na-Dee and Glen o' Dee)—May 21, 22 and 23; October 15, 16 and 17.

The fee for each course is three guineas, and applications should be sent to the Secretary, Tuberculosis Educational Institute, Tavistock House North, Tavistock Square, London, W.C.1.

N.A.P.T.

THIRD COMMONWEALTH AND EMPIRE HEALTH AND TUBERCULOSIS CONFERENCE

(CENTRAL HALL, LONDON)

Provisional Programme

Tuesday, July 8.

Morning: Tuberculosis—A problem for all peoples.
Afternoon: Domiciliary management of the open respiratory case and of the minimal lesion. Procedure at chest clinics and liaison with the family doctor.

Wednesday, July 9.

Morning: Prevention and care work by local health authorities. Protective vaccination.
Afternoon: Contemporary ideas in the management of the tuberculous patient.

Thursday, July 10.

Morning: Tuberculosis in British Colonial Territories.
Afternoon: Non-pulmonary tuberculosis as a clinical and administrative problem.—(*a*) Bovine infections and their results. (*b*) Non-respiratory tuberculosis in its rarer forms, e.g. skin, genito-urinary, ocular, diabetes.

Friday, July 11.

Morning: The social worker and the tuberculous family. The patient in industry.

CONFERENCE OF THE INTERNATIONAL UNION AGAINST TUBERCULOSIS

THE XIIth Conference of the International Union against Tuberculosis will be held at Rio de Janeiro, under the Presidency of Professor Manoel de Abreu, from August 24 to 27, 1952. The subjects for discussion are: " Immunity and Tuberculosis " (opening report by Prof. Arvid Wallgren, Sweden); " Treatment and Prognosis in Minimal Pulmonary Tuberculosis " (opening report by Dr. J. Burns Amberson, U.S.A.); " Organisation and Results in Regard to the Tuberculosis Campaign of Mass Surveys " (opening report by Dr. Fernando Gomez, Uruguay).

Members of the Union may take part in the Conference without paying an admission fee. Physicians who do not belong to the Union may apply for " Membership of the Conference " and should send in their application exclusively through their Government or National Association, who are alone qualified to forward such applications.

All requests for information concerning the scientific discussions should be sent to Prof. Etienne Bernard, Secretary-General of the International Union against Tuberculosis, 66, Boulevard St. Michel, Paris.

All requests concerning the organisation of the Congress should be sent to the Secretariate of the Conference, Avenida Mem de Sa 197, Rio de Janeiro.

Applications from physicians in Great Britain should be sent through the N.A.P.T.

TWO SYNTHETIC DRUGS " STOP TUBERCULOSIS "

MEDICAL and Pharmaceutical Information Bureau, New York, report that two coal-tar derivatives have been found to " stop tuberculosis " in " desperately " sick patients, according to a report by Dr. Marcus D. Kogel, Commissioner of New York City Hospitals. The " amazing results " reported by Dr. Kogel have been duplicated and confirmed in other public and private hospitals in the United States.

The drugs are known as Rimifon and Marsilid, and are variant forms of a common chemical, isonicotinic acid. The discovery of the drugs resulted from a tuberculosis research programme undertaken many years ago by Hoffmann-La Roche, Ltd., of Basle, Switzerland, and its affiliated company, Hoffmann-La Roche, Inc., of Nutley, New Jersey, U.S.A. During the course of the project, literally thousands of drugs were produced and screened against tuberculosis without significant results until the development of Rimifon and Marsilid.

The drugs, which have shown no serious side effects and highly beneficial results in some 200 patients in New York hospitals, are taken by mouth and appear to be specific in their action against the tubercle bacillus. They are the first drugs in the history of chemistry known to cure tuberculosis in mice. Following discovery by Drs. Robert J. Schnitzer and Emanuel Grunberg, of Hoffmann-La Roche, that the drugs worked against tuberculosis in mice and other animals, clinical trials with humans were undertaken.

The almost uniform results with human patients now raise the possibility that tuberculosis, which claims more lives than all other contagious diseases combined, may ultimately be eliminated as a world health problem.

While Hoffmann-La Roche officials have said only that the results to date in human patients " are encouraging," physicians in hospitals where the drugs

are being administered report that the drugs are said to work equally well in all forms of tuberculosis. The first series of patients selected were those who were regarded as "hopeless." Temperatures dropped to normal in some cases within thirty-six hours after treatment was begun, appetites were regained and weight increases were pronounced. In many instances no trace of bacteria could be found in the sputum after a few weeks. Patients ranged in age from 17 to 75.

Of the group of patients characterised by hospital doctors as hopeless, not one has died, no relapses have occurred in the eight months following the initial treatment, and as far as laboratory tests can show few tuberculosis germs remain in the diseased organs.

ANGLO-DANISH SANATORIUM SCHEME FOR CHILDREN

THROUGH the generosity of the Anglo-Danish Society a first party of twenty-five British tuberculous children, aged 8 to 15 years, left by air on March 19 for treatment at Vordingborg Sanatorium, Denmark. The children were selected by the Medical Committee of the National Association for the Prevention of Tuberculosis, and the British Red Cross co-operated in the arrangements for travel, escort and welfare.

Though the scheme is a private one it had from the outset the approval of the Ministry of Health, and chest physicians were asked to make recommendations of suitable children either from hospitals or from their homes. The scheme was started in the London Metropolitan Regional Hospital Board Areas, and the South-eastern Senior Administrative Medical Officer, Dr. Glyn Hughes, gave much assistance in planning the arrangements, including the use of part of one of the South-eastern General Hospitals as a reception centre. Three children are patients from the London Teaching Hospitals and several come from Bow Arrow Hospital, Dartford. It was later found possible to include a few cases from the Birmingham and Oxford Regions.

The NAPT Medical Committee, under the chairmanship of Dr. Andrew Morland, tried in choosing the children to make the Danish offer available to those who, either on account of the extent of their disease or their opportunities for treatment at home, were most likely to obtain benefit at Vordingborg. The results of the treatment, which will be of six to twelve months' duration, will be awaited with much interest by the parents and also by the Medical Committee, who have great confidence in the Danish doctors and in the methods which are carried out in Danish sanatoria.

As the majority of the children come from hospitals the scheme will be of direct benefit in freeing beds in this country and thus helping to reduce the waiting list of children, which, at a conservative estimate, is over 300.